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BULLETIN

DE LA

SOCIÉTÉ ROYALE ENTOMOLOGIQUE

D'ÉGYPTE

FONDEE LE 1er AOUT 1907

Fatti non foste a viver come bruti,
Ma per seguir virtude e conoscenza.

DANTE

Placée sous le Haut Patronage du Gouvernement Egyptien
par Décret Royal en date du 15 Mai 1923

Année 1936

LE CAIRE
IMPRIMERIE P. BARBEY
—
1936

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VINGT-NEUVIÈME ANNÉE

VINGTIÈME VOLUME

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—
1936

Les opinions émises dans les publications de la Société sont propres à leurs auteurs. La Société n'en assume aucunement la responsabilité.

Date de parution et de distribution du présent Volume :

28 Décembre 1936

Le Rédacteur en Chef :
A. ALFIERI.

DECRET APPROUVANT LES STATUTS DE LA SOCIETE ROYALE ENTOMOLOGIQUE D'EGYPTE [1].

Nous, Roi d'Egypte,

Considérant le but élevé pour lequel a été fondée la Société Royale Entomologique d'Egypte ;

Considérant l'opportunité d'encourager et de seconder les travaux de la dite Société ;

Sur la proposition du Président de Notre Conseil des Ministres et l'avis conforme du dit Conseil ;

DECRETONS :

Art. 1er. — La Société Royale Entomologique d'Egypte est placée sous le Haut Patronage du Gouvernement Egyptien.

Les statuts annexés au présent Décret sont approuvés [2].

Art. 2. — Le Président du Conseil des Ministres est chargé de l'exécution de Notre présent Décret.

Fait au Palais d'Abdine, le 29 Ramadan 1341.
(15 Mai 1923).

FOUAD.

Par le Roi :
Le Président du Conseil des Ministres,
YEHIA IBRAHIM.

(*Traduction*).

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(1) Ce Décret a été publié dans le *Journal Officiel* du Gouvernement Egyptien, numéro 77, en date du Jeudi 2 Août 1923.

(2) Le texte complet des statuts est également publié dans le Bulletin de cette Société, année 1922.

MEMBRES BIENFAITEURS :

1924 M. Moustapha El Salanikli Bey, de Damanhour (Béhéra).

1925 S.E. El Sayed Fathalla Mahmoud Pacha, de Rahmania (Béhéra).

» M. Riad Abdel Kawi El Gebali Bey, de Chebin El Kom (Menoufia).

» S.E. Georges Wissa Pacha, d'Assiout (Haute-Egypte).

» M. Yehia Kawalli Bey, de Minieh (Haute-Egypte).

» M. Yacoub Bibawi Attia Bey, de Minieh (Haute-Egypte).

» S.E. Hassan Charawi Pacha, de Minieh (Haute-Egypte).

» S.E. Habib Chenouda Pacha, d'Assiout (Haute-Egypte).

» M. Mohamed Tewfick Mohanna Bey, de Tewfikieh (Béhéra).

» M. Hassan Ahmed Moussa Bey, de Minieh (Haute-Egypte).

» M. Labib Barsoum Hanna Bey, de Minieh (Haute-Egypte).

» S.E. Hassan Mohamed El Tahtawi Pacha, de Guirgheh (Haute-Egypte).

» M. Kassem Osman El Labban Bey, de Guirgheh (Haute-Egypte).

» M. Dordeir El Sayed Ahmed El Ansari Bey, de Guirgheh (Haute-Egypte).

» M. Barsoum Said Abdel Messih Bey, de Minieh (Haute-Egypte).

» M. Dordeir Taha Abou Gounema Bey, de Minieh (Haute-Egypte).

1926 M. Mohamed Rifaat El Roznamgy Bey.

1927 M. le Dr. Walter Innes Bey, du Caire.

» M. le Dr. Avocat Giovanni Ferrante, du Caire.

1928 M. Hassan C. Efflatoun Bey, du Caire.

» M. Hugo Lindeman, d'Alexandrie.

1932 M. Alfred Reinhart, d'Alexandrie †.

Membres du Conseil de la Société Royale Entomologique d'Egypte en 1936 :

S.E. le Dr. Mohamed Shahine Pacha, *Président* (décédé le 16 Mai).

M. le Prof. Dr. Herman Priesner, *Vice-Président.*

M. le Prof. Hassan C. Efflatoun Bey, *Vice-Président.*

M. Anastase Alfieri, *Secrétaire-Général.*

M. Richard Wilkinson, *Trésorier.*

M. Fouad Abaza Bey.

M. Said Bahghat.

M. Edgard Chakour.

M. le Dr. Kamel Mansour.

M. Abdel Megid El Mistikawy.

M. le Dr. Hamed Seleem Soliman.

M. le Prof. Guido Torriani.

Comité Scientifique :

M. le Prof. Dr. H. Priesner, M. le Prof. Hassan C. Efflatoun Bey, M. le Dr. Kamel Mansour, M. Anastase Alfieri.

Censeurs :

M. le Dr. A. Azadian et M. E. Kaourk.

BULLETIN

DE LA

SOCIÉTÉ ROYALE ENTOMOLOGIQUE D'ÉGYPTE

Liste des Membres de la Société en 1936

(Les noms des Membres Fondateurs sont précédés de la lettre F)

Vice-Présidents Honoraires

F — Ferrante (Dr. Avocat Giovanni), Rue El Nemr, au Caire.

F — Innes Bey (Dr. Walter), c/o F. C. Krebser, 149, Avenue Sedky Pacha, Zizinia, Ramleh.

Membres Honoraires

1908 — Alluaud (Charles), Les Ouches, à Crozant (Creuse), France.

» — Bugnion (Dr. Edouard), « La Luciole », Avenue Pasteur, Aix en Provence (Bouches du Rhône), France.

1924 — Ebner (Prof. Richard), 3, Beethovengasse, Vienne IX, Autriche.

» — Horvath (Dr. Geza), Musée National Hongrois, Budapest, Hongrie.

1909 — Marchal (Dr. Paul), 45, Rue de Verrières, à Antony (Seine), France.

1917 — Navas (R. P. Longin), Colegio del Salvador, Apartado 32, Zaragoza, Espagne.

1929 — Parent (l'Abbé O.), Institution Ste Marie, Aire sur la Lys, Pas de Calais, France.

» — Peyerimhoff de Fontenelle (P. de), 37, Boulevard Saint-Saëns, Alger, Algérie.

1908 — Pic (Maurice), à Digoin (Saône et Loire), France.

1921 — Pierre (Claude), 7 bis, Rue du Loing, Paris (XIV^{e}), France.

1909 ROTHSCHILD (Lord), Tring Park, Tring, Herts, Angleterre.

1936 SEIF EL-NASR Pacha (S.E. AHMED HAMDI), Ministre de l'Agriculture, Rue Khosro Pacha, Helouan, près le Caire.

1929 THÉRY (André), Laboratoire d'Entomologie, Museum National d'Histoire Naturelle, 45 bis, Rue de Buffon, Paris (V°), France.

1920 TONNOIR (André), Senior Research Officer, Division of Economic Entomology, Council for Scientific and Industrial Research, P.O. Box 109, Canberra, F.C.T., Australia.

» VILLENEUVE (Dr. Joseph), Rue des Vignes, Rambouillet (Seine et Oise), France.

» WILLCOCKS (F.C.), 18, Watcombe Road, W. Southbourne, Bournemouth, Hampshire, Angleterre.

Membres Correspondants

1932 ALFKEN (J.D.), 18, Delmestrasse, Brême, Allemagne.

» BALLARD (Edward), Government Entomologist, Department of Agriculture and Forests, Jerusalem, Palestine.

1924 CROS (Dr. Auguste), 6, Rue Dublineau, Mascara, Algérie.

1928 D'ORCHYMONT (A.), 176, Avenue Houba de Strooper, Bruxelles (II), Belgique.

1924 FALCOZ (Dr. Louis), 71, Rue de la Gare, Lyon-Villeurbanne, France.

» FLOWER (Major Stanley Smyth), Tring, Herts, Angleterre.

1934 GADEAU DE KERVILLE (Henri), 7, Rue du Passage Dupont, Rouen, France.

1926 HALL (W.J.), Superintendent of the Mazoe Estate and Experimental Station, B.S.A. Company Citrus Estate, Mazoe, Southern Rhodesia, South Africa.

1923 HERVÉ-BAZIN (Prof. Dr. J.), Le Patys, par Segré (Maine et Loire), France.

1924 HINDLE (Dr. Prof. Edouard), Magdelene College, Cambridge, Angleterre.

1931 Horn (Dr. Walther), Deutsches Entomologisches Institut, Gossler Str. 20, Berlin-Dahlem, Allemagne.

1923 Hustache (A.), Pensionnat St. Laurent, à Lagny (Seine et Marne), France.

1925 Kirkpatrick (Thomas Winfrid), East African Agricultural Research Station, Section of Entomology, Amani (via Tanga), Tanganyika Territory, British East Africa.

1934 Koch (C.), Conservateur du Musée Entomologique « Pietro Rossi » de S.A.S. le Prince Alexandre della Torre e Tasso, Duino (près Monfalcone), Italie.

» Luigioni (Dr. Paolo), R. Delegato Fitopatologico, 3, Via Ludovico di Vartema (Testaccio), Rome, Italie.

1929 Masi (L.), Museo Civico di Storia Naturale « Giacomo Doria », 9, Via Brigata Liguria, Genova (102), Italie.

1930 Mellor (J.E.M.), The Prospect Cottage, Bredwardine, Herefordshire, Angleterre.

1934 Paoli (Prof. Guido), Directeur du R. Osservatorio per le Malatie delle Piante, 1, Via Marcello Durazzo, Gênes, Italie.

» Schatzmayr (Prof. A.), Directeur du Musée Entomologique « Pietro Rossi » de S.A.S. le Prince Alexandre della Torre e Tasso, Duino (près Monfalcone), Italie.

1927 Williams (C.B.), Rothamsted Experimental Station, Harpenden, Angleterre.

Membres Titulaires

1913 Abaza Bey (Fouad), Boîte Postale N° 63, au Caire.

1933 Abdel Malek (Ragheb), Entomologiste, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1925 Agricultural School Mikveh-Israel, P.O. Box 185, Tel-Aviv, Palestine.

1909 Alfieri (Anastase), Boîte Postale N° 430, au Caire.

1924 Azadian (Dr. A.), Laboratoires d'Hygiène Publique, au Caire.

1908 Bahari Bey (G.C.), 11, Rue Seif el Dine El Mahrani, Fagala, au Caire.

1928 Bahghat (Said), Boîte Postale N° 63, au Caire.

1936 Bibliothèque du Ministère de l'Instruction Publique, Rue El Falaki, au Caire.

1929 Bichara (Ibrahim), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1934 Bittar (Andrew), 45, Rue Ibrahim Pacha, Bittar Building, au Caire.

1923 Bodenheimer (Prof. F.S.), Directeur du Département de Zoologie Générale et d'Entomologie, Université Hébraïque, Boîte Postale No. 340, Jérusalem, Palestine.

1933 Calzolari (Emilio), Ingénieur Agronome, 28, Rue Chérif Pacha, Alexandrie.

1929 Cassab (Antoine), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

F Chakour (Edgard), Secrétaire Général de la Société Anonyme des Eaux du Caire, Rue Foum El-Teraa El-Boulakia, au Caire.

1933 Chazette (Fernand), Professeur de Sciences Naturelles, Lycée Français, 2-4, Rue Haouayati, au Caire.

1931 Compagnie Universelle du Canal Maritime de Suez, Kasr el Doubara, au Caire.

1934 Crédit Foncier Egyptien (Monsieur l'Administrateur Délégué), Rue Manakh, au Caire.

1928 Dollfus (Robert Ph.), Museum National d'Histoire Naturelle, 57, Rue Cuvier, Paris (V^{me}), France.

1919 Efflatoun Bey (Hassan C.), Professeur d'Entomologie et Vice-Doyen de la Faculté des Sciences (Université Egyptienne), 72, Rue Abdel Rahman Pacha, Hélouan, près le Caire.

1920 Efflatoun Pacha (S.E. Mohamed), Meadi, près le Caire.

1934 Faculté d'Agriculture, Université Egyptienne, Ghizeh, près le Caire.

1933 Frangopoulos (A.M.), B.A., B.Sc., Assistant Government Entomologist, Nicosia, Cyprus.

1936 Fund Bib-ka Sredne-Asiatsk. Gos. Universiteta, Potchtovij jaschtik, No. 47, Taschkent, U.S.S.R.

1932 Gantes (Edouard), 3, Rue El Ibrahimi, Kasr El Doubara, au Caire.

1914 Garboua (Maurice), 8, Rue Kasr el Nil, au Caire.

1907 Garozzo (A.S.), Ingénieur, 11, Rue Zaki, Tewfikieh, au Caire,

1927 Ghali Pacha (S.E. Wacef Boutros), Avenue de Ghizeh, près le Caire.

1935 Glyki (Marc), Directeur du Département de Protection des Plantes, Grun Brothers, Boîte Postale No. 600, au Caire.

1921 Greiss (Elhamy), Département Botanique, Faculté des Sciences, Université Egyptienne, Abbassieh, au Caire.

1936 Hafez Ibrahim (Mahmoud), Démonstrateur au Département de Zoologie, Faculté des Sciences, Université Egyptienne, Abbassieh, au Caire.

1930 Hanafy Bey (Mahmoud), 12, Rue Akhshid, Manial El Roda, près le Caire.

1928 Hassan (Dr. Ahmed Salem), Professeur de Zoologie et d'Entomologie à la Faculté d'Agriculture, Université Egyptienne, Ghizeh, près le Caire.

1908 Hess (Dr. Ernest), 10, Rue Antikhana El Masria, Kasr el Nil, au Caire.

1932 His Majesty Stationery Office, Princes Street, Westminster, S.W.1, London, Angleterre.

1925 Hocheiry (Abd-El-Baki Záki El), Conseiller à la Cour d'Appel Indigène, 22, Rue Abou el Feda, Zamalek, au Caire.

1924 Honoré (A.), Chimiste, Raffinerie de Hawamdieh, Haute-Egypte.

» Houriet (Raoul), Conseiller à la Cour d'Appel Mixte, Alexandrie.

1927 Housny (Mahmoud), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1936 Imperial Chemical Industries (Egypt) S.A., 19, Rue Kasr el Nil, au Caire.

1930 Independent Biological Laboratories, 23, Nve Shaanan, P.O. Box 1071, Tel Aviv, Palestine.

1928 Izzet Bey (Mohamed), 14, Midan el Daher, au Caire.

1915 Jullien (Joseph), 248, Rue de Thèbes, Cleopâtra les Bains, par Sidi Gaber.

1927 Kamal (Dr. Mohamed), Cotton Research Board, Ministère de l'Agriculture, Ghizeh, près le Caire.

1922 Kaourk (Elias A.), Expert Comptable, 35, Rue Kasr el Nil, au Caire.

1926 Kassem (Mohamed), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1923 Laboratoires d'Hygiène Publique, Bibliothèque de la Section d'Helminthologie, au Caire.

1931 Land Bank of Egypt (Mons. l'Administrateur-Directeur de la), Boîte Postale No. 614, Alexandrie.

1923 Librarian, Agricultural Research Service, Wad Medani, Soudan.

1921 Limongelli (Mme Vve C. Artin D.), 5, Midan Cheikh Youssef, Kasr el Doubara, au Caire.

1934 Lotte (Dr. F.), Boîte Postale No. 222, Port-Said.

1931 Lycées Français, 2-4; Rue Haouayati, au Caire.

1932 Madwar (Dr. Saadallah Mohamed), Research Institute and Endemic Diseases Hospital, 10, Rue Kasr El Aini, au Caire.

» Maloeuf (N. S. Royston), Graduate School, McGraw Zoological Laboratory, Cornell University, Ithaca, New York, U. S. America.

1927 Mansour (Dr. Kamel), Professeur-adjoint, Département de Zoologie, Faculté des Sciences, Abbassieh, au Caire.

1921 Mistikawy (Abdel Megid El), Sous-Directeur de la Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1933 Mochi (Alessandro), 119, Avenue Malika Nazli, au Caire.

1926 Mortera (Aldo), Savoy Chambers, Boîte Postale No. 739, au Caire.

1929 Mosseri (Henri), 25, Rue Cheikh Abou El Sebaa, au Caire.

1931 Papayoannou (Prof. Dr. Théodore), Hôpital Papayoannou, Boulac El Dacrour, Ghizeh, près le Caire.

1911 Petroff (Alexandre), 15, Boulevard Saad Zagloul, Alexandrie.

1928 Priesner (Prof. Dr. H.), Directeur de la Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1932 Rivnay (E.), Institute of Agriculture and Natural History, Agricultural Experiment Station, P. O. Box 121, Tel Aviv, Palestine.

1925 Royal Entomological Society of London (The), 41, Queen's Gate, South Kensington, S.W. 7, Londres, Angleterre.

1924 Shaw (Fred), c/o Cassel Cyanide Dept., Imperial Chemical House, Milbank, Londres, S.W.1, Angleterre.

1921 Société Royale d'Agriculture, Laboratoire d'Entomologie de la Section Technique, Boîte Postale No. 63, au Caire.

1931 Soleri (Dr. Umberto), Chef de l'Observatoire Phytopathologique du Gouvernement des Iles Italiennes de l'Egée, Rhodes (Egée).

1934 Soliman (Dr. Hamed Seleem), Faculté d'Agriculture, Université Egyptienne, Ghizeh, près le Caire.

1928 Soliman (Dr. Labib Boutros), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1936 Taher El Sayed (Dr. Mohamed), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1933 Taihoku Imperial University Library (The), Taihoku, Formosa, Japon.

1926 Tewfik (Mohamed), Préparateur au Département de Zoologie, Faculté des Sciences, Université Egyptienne, Abbassieh, au Caire.

1933 Torriani (Guido), Professeur de Sciences Naturelles aux Ecoles Royales Moyennes Italiennes, 33, Rue Soliman Pacha, au Caire.

1935 Tractor Company of Egypt, S.A.E. (The), 140, Rue Emad El Dine, Boîte Postale No. 366, au Caire.

1923 Vallet (Jean), Avocat, Immeuble Rabbat, Avenue Fouad Ier, au Caire.

1926 Waly (Dr. Mohamed), Conférencier en Zoologie, Faculté des Sciences, Université Egyptienne, Abbassieh, au Caire.

1912 Wilkinson (Richard), Pyramid House, 24, Rue Saraya El Gezira, Zamalek, au Caire.

1915 Zoological Service, Ghizeh, près le Caire.

1926 Zulficar (Samir), Maadi, près le Caire.

Institutions Scientifiques et Bibliothèques

Afrique Occidentale Française:

Monsieur le Gouverneur Général (Comité d'Etudes Historiques et Scientifiques), Dakar, Sénégal.

Afrique du Sud:

South African Museum, P.O. Box 61, Cape Town.

Department of Agriculture of the Union of South Africa (The Agricultural Journal of the Union of South Africa), Pretoria.

Department of Agriculture of the Union of South Africa, Division of Entomology, P.O. Box 513, Pretoria.

Algérie:

Société d'Histoire Naturelle de l'Afrique du Nord, Faculté des Sciences d'Alger, Alger.

Allemagne:

Deutsche Entomologische Gesellschaft, 43, Invalidenstrasse, Berlin (IV).

Senckenbergischen Naturforschenden Gesellschaft, Bibliothek, Viktoria Allee 9, Frankfurt A/M.

Bücherei des Zoologischen Museums, 43, Invalidenstrasse, Berlin (IV).

Gesellschaft für Vorratsschutz E.V. (Mitteilungen der), 31, Zimmermannstrasse, Berlin-Steglitz.

Bücherei der Biologischen Reichsanstalt für Land- und Forstwirtschaft, 19, Königin-Luise-Str., Berlin-Dahlem.

Deutches Entomologisches Institut (Arbeiten über morphologische und taxonomische Entomologie), 20, Gossler Strasse, Berlin-Dahlem.

Deutsche Kolonial und Uebersee-Museum, Bahnhofsplatz, Brême.

Angleterre :

The Imperial Institute of Entomology, Review of Applied Entomology, 41, Queen's Gate, London S.W. 7.

Zoological Museum (Novitates Zoologicæ), Tring Park, Tring, Herts.

The Apis Club (The Bee World), The Way's End, Foxton, Royston, Herts.

The Philosophical Society of Cambridge, Zoological Laboratory, The Museums, Cambridge.

The Librarian, The Zoological Society of London, Zoological Gardens, Regent's Park, London, N.W.8.

Argentine :

Instituto Biologico de la Sociedad Rural Argentina, Buenos Aires.

Sociedad Cientifica Argentina, Calle Santa Fé, 1145, Buenos Aires.

Sociedad Entomologica Argentina, Museo Nacional de Historia Natural, Buenos Aires.

Museo Nacional de Historia Natural « Bernadino Rivadavia », Casilla de Correo N° 470, Buenos Aires.

Ministerio de Agricultura (Boletin del Ministerio de Agricultura de la Nacion), Bibliotheca, 974, Paseo Colon, Buenos Aires.

Autriche :

Intendanz des Naturhistorischen Museums, Burgring 7, Vienne (I).

Zoologisch-Botanische Gesellschaft, 2, Mechelgasse, Vienne (III).

Koleopterologische Rundschau, c/o Zoologisch-Botanische Gesellschaft, 2, Mechelgasse, Vienne (III).

Australie :

The Australian Museum (Records of the Australian Museum), Sydney, N.S.W.

The Entomologist's Office, Department of Agriculture, Sydney, N.S.W.

The Public Library, Museum, and Art Gallery of South Australia, Box 386 A, G.P.O., Adelaide, South Australia.

The Library of the Division of Economic Entomology, P.O. Box No. 109, Canberra City, F.C.T.

The Linnean Society of New South Wales, Science House, Gloucester and Essex Streets, Sydney, N.S.W.

Belgique:

Société Entomologique de Belgique, 31, Rue Vautier, Bruxelles.

Société Scientifique de Bruxelles, Secrétariat, 2, Rue du Manège, Louvain.

Monsieur A. Moureau, Secrétaire du Bulletin de l'Institut Agronomique et des Stations de Recherches de Gembloux, Institut Agronomique de l'Etat, Gembloux.

Lambillionea, Revue Mensuelle de l'Union des Entomologistes Belges (M. F. Derenne), 123, Avenue de la Couronne, Ixelles (Bruxelles).

Annales du Musée du Congo Belge, Tervueren.

Association des Ingénieurs sortis de l'Institut Agronomique de l'Etat, à Gembloux, 35, Avenue des Volontaires, Anderghem-Bruxelles.

Brésil:

Museu National do Rio de Janeiro, Rio de Janeiro.

Instituto Biologico, Bibliotheca, Caixa Postal 2821, Sâo Paulo.

Instituto Oswaldo Cruz, Caixa de Correio 926, Rio de Janeiro.

Instituto de Biologia Vegetal, Jardim Botanico, Rio de Janeiro.

Bulgarie:

Institutions Royales d'Histoire Naturelle, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Entomologique de Bulgarie, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Bulgare des Sciences Naturelles, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Canada:

Entomological Society of Ontario (The Canadian Entomologist & Reports), Guelph, Ontario.

Library, Department of Agriculture, West Block, Ottawa.

Department of Agriculture, Entomological Branch, Ottawa.

Nova Scotian Institute of Science, Halifax.

Chine:

The Lingnan Science Journal, Lingnan University, Canton.

Bulletin of the Biological Department, Science College, National Sun Yat-Sen University, Canton.

Bureau of Entomology of the Chekiang Province, West Lake, Hangchow.

Chypre:

The Cyprus Agricultural Journal (The Office of the Governement Entomologist), Nicosia.

Cuba:

Sociedad Cubana de Historia Natural « Felipe Poey » (Memorias), c/o Dr. Carlos Guillermo Agnayo, 25 N° 254, Vedado, La Havane.

Danemark:

Entomologisk Forening, Zoologisk Museum, Krystalgade, Copenhague.

Egypte:

Bibliothèque du Cabinet de S.M. le Roi, Palais d'Abdine, au Caire.

Bibliothèque privée de S.M. le Roi, Palais d'Abdine, au Caire.

Ministère de l'Agriculture, Bibliothèque de la Section d'Entomologie, Dokki (Ghizeh), près le Caire.

Société Royale d'Agriculture, Bibliothèque de la Section Technique, Boîte Postale N° 63, au Caire.

Union des Agriculteurs d'Egypte, 25, rue Cheikh Abou El Sebaa, au Caire.

The Bee Kingdom, 9, rue El Moez, Matarieh, près le Caire.

Bibliothèque Centrale, Cotton Research Board, Ministère de l'Agriculture, Ghizeh, près le Caire.

Al-Fellaha, Boîte Postale N° 2047, au Caire.

Société Royale de Géographie d'Egypte, 45, rue Cheikh Youssef, au Caire.

The Journal of the Egyptian Medical Association, 5, rue El Sanafiri, Abdine, au Caire.

Société Royale d'Economie Politique, de Statistique et de Législation, Boîte Postale N° 732, au Caire.

Institut d'Egypte, 1, rue Cheikh Rihan, au Caire.

Bibliothèque Nationale Egyptienne, Midan Bab El Khalq, au Caire.

Bibliothèque du Musée Agricole Fouad Ier, c/o Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

Bibliothèque de la Faculté de Médecine, University Egyptienne, au Caire.

Bibliothèque de la Faculté des Sciences, Université Egyptienne, Abbassieh, au Caire.

Equateur (République de l'), Amérique du Sud:

Director General de Agricultura (Revista del Departamento de Agricultura), Quito.

Boletin de la Seccion Agricola del Banco Hipotecario del Ecuador, Apartado 685, Quito.

Espagne:

Instituto Nacional de 2ª Ensenanza de Valencia, Laboratorio de Hidrobiologia Espanola, Valencia.

Junta para ampliacion de Estudios e Investigaciones Cientificas, 4, Duque de Medinaceli, Madrid.

Junta de Ciencies Naturales de Barcelona, Museo Municipal, Barcelona.

Academia de Ciencias y Artes de Barcelona, Barcelona.

Sociedad Espanola de Historia Natural, Museo Nacional de Ciencias Naturales, Hipodromo, Madrid (VI).

Estacion de Patologia Vegetal, Instituto Nacional Agronomico, La Monclea, Madrid (VIII).

Etats-Unis:

Buffalo Society of Natural Sciences, Buffalo Museum of Science, Humboldt Park, Buffalo, New-York.

University of Illinois Library, Exchange Division, Urbana, Illinois.

Library of the American Museum of Natural History, Central Park, New-York City.

Pacific Coast Entomological Society (The Pan-Pacific Entomologist), California Academy of Sciences, Golden Gate Park, San Francisco, California.

Academy of Natural Sciences, Entomological Section, Lagon Square, Philadelphia.

Experiment Station of the Hawaiian Sugar Planters' Association, P.O. Box 411, Honolulu, T.H., Hawai.

Hawaiian Entomological Society, c/o Experiment Station of the Hawaiian Sugar Planters' Association, P.O. Box 411, Honolulu, T.H., Hawai.

Carnegie Museum, Department of the Carnegie Institute, Pittsburgh, Pennsylvania.

American Entomological Society, Lagon Square, Philadelphia.

United States Department of Agriculture, Washington, D.C.

General Library, University of Michigan, Ann Arbor, Michigan.

United States National Museum, Smithsonian Institution, Washington, D.C.

University of California Library, Berkeley, California.

Library of the New-York State College of Agriculture and Agricultural Experiment Station, Cornell University, Ithaca, New-York.

Smithsonian Institution, Washington, D.C.

New-York Academy of Sciences, New-York.

Pennsylvania State Health Department, Pennsylvania.

Entomological Society of Washington, Washington.

Graduate School of Tropical Agriculture and Citrus Exprimental Station, Riverside, California.

Wisconsin Academy of Sciences, Arts, and Letters, Madison, Wisconsin.

Library, Minnesota Agricultural Experiment Station, University Farm, Saint Paul, Minnesota.

Coleopterological Contributions (Dr Frank J. Psota), 4046 West, 26th Street, Hawthorne Station, Chicago, Illinois.

Museum of Comparative Zoology, Harward College, Cambridge, Mass.

The Philippine Agriculturist, Library, College of Agriculture, Agricultural College, Laguna, Philippine Islands.

Editorial Office, The American Midland Naturalist, University of Notre Dame, Notre Dame, Indiana.

Marine Biological Laboratory, Library, Woods Hole, Mass.

Finlande:

Societas Entomologica Helsingforsiensis, Helsinki.

Societas pro Fauna et Flora Fennica, Kaserngatan 24, Helsinki.

Societas Zoolog.-Botanica Fennica Vanamo, Fabiani 22, Helsinki, Suomi.

Société Entomologique de Finlande (Annales Entomologici Fennici), Institut de Zoologie Agricole et Forestière de l'Université, Snellmaninkatu 5, Helsinki.

France:

L'Echange, Revue Linnéenne, Digoin (Saône et Loire).

Revue Scientifique du Bourbonnais et du Centre de la France, 22, Avenue Meunier, Moulins (Allier).

Société d'Etudes des Sciences Naturelles de Nîmes, 6, Quai de la Fontaine, Nîmes (Gard).

Société de Pathologie Végétale et d'Entomologie Agricole de France, Laboratoire de Pathologie Végétale, Institut National Agronomique, 16, Rue Claude Bernard, Paris (V°).

Société Linnéenne de Bordeaux, Athénée, 53, rue Des Trois Conils, Bordeaux.

Société Linnéenne de Lyon, 33, rue Bossuet (Imm. Municipal), Lyon.

Société des Sciences Naturelles de l'Ouest de la France, Nantes (Loire Inférieure).

Association des Naturalistes de Levallois-Perret, 153, rue du Président Wilson (Domaine de la Planchette), Levallois-Perret (Seine).

Société Linnéenne du Nord de la France, 81, rue Lemerchier (M. Pauchet), Amiens.

Société Géologique de Normandie et des Amis du Museum du Havre,

Hôtel des Sociétés Savantes, 56, rue Anatole France, Le Havre (Seine Inférieure).

Société d'Histoire Naturelle de Toulouse, Bibliothèque Universitaire de la Faculté de Médecine, Allée Saint-Michel, Toulouse.

Société Entomologique de France, Institut National Agronomique, 16, Rue Claude Bernard, Paris (V°).

Société d'Etudes Scientifiques de l'Aude, Carcassone (Aude).

Annales des Epiphyties et de Phytogénétique, Centre National des Recherches agronomiques, à Versailles, France.

Museum National d'Histoire Naturelle, Bibliothèque, 8, Rue de Buffon, Paris (V°).

Société de Zologie Agricole (Revue de Zoologie Agricole et Appliquée), Faculté des Sciences, Institut de Zoologie, Cours de la Marne, Bordeaux.

Grèce:

Institut Phytopathologique Benaki, Kiphissia (près Athènes).

Bibliothèque de l'Institut et Musée Zoologique de l'Université, Athènes.

Hollande:

Nederlandsche Entomologische Vereeniging, p/a Zoölogisch Museum, Amsterdam.

Landbouwhoegeschool Laboratorium voor Entomologie, Berg 37, Wageningen.

Hongrie:

Magyar Nemzeti Muzeum (Allattar), Museum Nationale Hungaricum, Sectio Zoologica, Budapest 80.

Indes:

Zoological Survey of India (Records of the Indian Museum), Indian Museum, Calcutta.

Madras Governement Museum, Connemara Public Library, Egmore, Madras.

Agricultural Research Institute, Library, Pusa, Bihar.

Agricultural Research Institute, Entomological Section, Pusa Bihar.

Indes Néerlandaises:

Instituts Scientifiques de Buitenzorg's Lands Plantentuin (Treubia), (den Directeur van Landbouw, Nijverheid en Handel), Buitenzorg, Java.

Italie:

Museo Civico di Storia Naturale « Giacomo Doria », 9, Via Brigata Liguria, Genova (102).

Museo Civico di Storia Naturale di Trieste (Atti del), 4, Piazza Hortis, Trieste.

Società dei Naturalisti in Napoli, Reale Università, Via Mezzocannone, Napoli.

Società Entomologica Italiana, Museo Civico di Storia Naturale, 9, Via Brigata Liguria, Genova (102).

Accademia Scientifica Veneto Trentino Istriana, Padova (Veneto).

Società Adriatica di Scienze Naturali, 7, Via dell'Annunziata, Trieste.

La Reale Stazione di Entomologia Agraria (Redia), 19, Via Romana, Firenze (32).

La Reale Stazione Sperimentale di Gelsicoltura e Bachicoltura di Ascoli Piceno.

Istituto Zoologico della Reale Università di Napoli, Napoli.

Laboratorio di Zoologica Generale e Agraria, Napoli (Portici).

Bibliothèque de l'Institut International d'Agriculture (Moniteur International de la Protection des Plantes), Villa Umberto I, Rome (110).

Società italiana di Scienze Naturali, Palazzo del Museo Civico di Storia Naturale, Corso Venezia, Milano.

Istituto di Zoologia della Reale Università di Genova (Bollettino dei Musei di Zoologia e di Anatomia comparata), 5, Via Balbi, Genova.

Società dei Naturalisti e Matematici di Modena, presso la Reale Università, Modena.

Istituto di Entomologia della Reale Università, 6, Via Filippo Re, Bologna (125).

Società di Studi per la Venezia Tridentina (Studi Trentini di Scienze Naturali), Biblioteca Communale, Trento.

Museo di Storia Naturale della Venezia Tridentina (Memorie del), Casella Postale 250, Trento.

Instituto Agricolo Coloniale Italiano, 9, Viale Principe Umberto, Firenze (8).

Museo Entomologico « Pietro Rossi », Duino (presso Monfalcone).

Società Veneziana di Storia Naturale (presso Sig. Antonio Giordani Soika), S. Marco 254, Venezia.

Japon:

Saghalien Central Experiment Station, Konuma, Saghalien.

The Ohara Institute for Agricultural Research, Library, Kurashiki, Okayama-Ken.

Imperial Agricultural Experiment Station (Journal of the), Nishigahara, Tokyo.

Departement of Agriculture, Government Research Institute, Taihoku, Formosa.

The Kansai Entomological Society, Cho Teranishi : 221 Ikue-chc, Higashinari-ku, Osaka.

Kenya:

East Africa and Uganda Natural History Society, Coryndon Memorial Museum, P.O.Box 658, Nairobi, Kenya Colony, British East Africa.

Maroc:

Société des Sciences Naturelles du Maroc, Institut Scientifique Chérifien, Rabat.

Mésopotamie:

The Director of Agriculture, Baghdad.

Mexique:

Junta Nacional Directora de la Campana contra la Langosta (Junosta), Biblioteca, Departamento Directivo, Veracruz.

Bibliotheca del Instituto Biotecnico, Calzada Mexico-Tacuba N° 295, Col. Anahuac, D.F.

Bibliotheca del Instituto de Biologia, Universidad Nacional Autonoma, Chapultepec (Casa del Lago), Mexico, D.F.

Norvège:

Tromso Museum Library, Tromso.

Panama (République de):

Departamento Seccional de Agricultura (Boletin Agricola), Panama.

Pologne:

Musée Zoologique Polonais, Krakowskie Przedmiescie 26/28, Varsovie.

Société Polonaise des Entomologistes, Rutowskiego 18, Lwow.

Institut de Recherches des Forêts de l'Etat, Wawelska 54, Varsovie.

Portugal:

Société Portugaise des Sciences Naturelles, Instituto de Fisiologia, Faculdade de Medicina, Lisbonne.

Museum Zoologique de l'Université de Coimbra, Largo Marquês de Plombal, Coimbra.

Roumanie:

Société Transylvanienne des Sciences Naturelles (Siebenbürgischer Verein für Naturwissenschaften), Hermannstadt, Sibiu.

Academia Romana, Bibliothèque, Calea Victoriei, 125, Bucarest.

Russie (U.S.S.R.):

Société Entomologique de Russie (Revue Russe d'Entomologie et Horae), Musée Zoologique de l'Académie des Sciences, Léningrad.

Bibliothèque de l'Académie des Sciences de l'Ukraine, 58a, Rue Korolenko, Kiew (Ukraine).

Société des Naturalistes de Kiew, 37-10, Rue Korolenko, Kiew (Ukraine).

Institut des Recherches Biologiques de l'Université de Perm, Perm II, Zaimka.

Institute for Plant Protection, Bureau of Applied Entomology and Zoology, Library, 10, Elagin Ostrov, Léningrad.

Rédaction du Journal « Plant Protection », 7, Rue Tschaikovsky, Leningrad.

Institute for controlling Pests and Diseases, Library, 7, Tschaikovsky Str., Leningrad 28.

Siam:

Department of Agriculture and Fisheries, Entomology Section, Bangkok.

Suède:

K. Swenska Vetenskapsakademien i Stockholm, Stockholm 50.

Entomologiska Foreningen, Brottninggatten 94, Stockholm.

Göteborgs Kungl. Vetenskaps-och Vitterhets Samhälles, Göteborg.

Statens Växtskyddsanstalt, Experimentalfältet, Stockholm.

Bibliothèque de l'Université de Lund, Lund.

Suisse:

Bibliothèque de la Société Entomologique Suisse, Musée d'Histoire Naturelle, Berne.

Zentralbibliotek, Naturforschenden Gesellschaft, Zurich.

Tchèco-Slovaquie:

Societas Entomologica (Casopis), u Karlova 3, Prague II.

Section Entomologique du Musée National de Prague (Sbornik), Vaclavské namesti II.-1700, Prague.

Uruguay (République de l'):

Escuela de Veterinaria del Uruguay (Anales de la Escuela de Veterinaria del Uruguay), Itazaingo 1461, Montévideo.

Sociedad de Biologia de Montevideo, Casilla de Correo 567, Montevideo.

Yougo-Slavie:

Societas Entomologica Jugoslavica (Glasnik), 17, Garasaninovo ulica, Belgrade.

Abonnements de la Société

The Transactions and Proceedings of the Royal Entomological Society of London.

The Macrolepidoptera of the World (édité par le Dr. A. Seitz).

Coleopterorum Catalogus (édité par W. Junk - S. Schenkling).

Entomologische Blätter (Zeitschrift für Biologie und Systematik der Käfer), édité par R. Kleine (Stettin).

N.B. — Pour changement d'adresse, erreurs ou omissions, s'adresser à M. le Secrétaire Général de la Société Royale Entomologique d'Egypte, Boîte Postale N° 430, au Caire.

Le 28 Avril dernier s'éteignait Sa Majesté Fouad 1er, Roi d'Egypte.

Ce deuil, qui frappe le Pays tout entier, sera plus cruellement encore ressenti par notre Société à laquelle le Souverain défunt s'intéressait d'une façon toute particulière.

A l'avènement au trône de Sa Majesté le Roi Fouad 1er, la Société Entomologique d'Egypte venait d'accomplir sa dixième année d'existence.

Le nouveau Monarque, qui en avait suivi de près les modestes débuts, était bien au courant de ses travaux et des difficultés innombrables qu'elle avait eu à affronter.

En Souverain éclairé, Il avait discerné l'importance que l'étude approfondie de l'entomologie pouvait avoir pour un pays éminemment agricole tel que l'Egypte.

Deux mois à peine s'étaient écoulés depuis Son avènement au trône quand la Société fut placée sous Son Haut Patronage.

Dès lors, grâce à la constante et généreuse sollicitude de Son Eminent Protecteur, elle devait prendre un essor de plus en plus considérable et inaugurer une ère féconde en utiles travaux.

En 1918 et en 1921, devant un budget déficitaire, notre Société appréhendait la suspension de ses publications. Ce fut Sa Majesté Fouad 1er qui, par des donations prélevées sur Sa cassette particulière, vint à son secours et lui permit de poursuivre sa tâche.

Lorsque le Roi jugea qu'il y avait lieu de donner à notre Institut une plus grande extension, un Décret Royal, en date du 15 Mai 1923, vint le placer sous le Haut Patronage du Gouvernement Egyptien. Dès lors, il s'intitula : la Société Royale Entomologique d'Egypte.

Cette même année, grâce à l'intervention du Souverain, le Gouvernement de Sa Majesté nous accordait une subvention annuelle. Il approuvait également la concession d'une vaste superficie de terrain sur laquelle devait s'ériger le Siège de la Société.

En Février 1924, Sa Majesté fit généreusement parvenir à la Société Royale Entomologique d'Egypte la somme de L.E. 3000 qui devait constituer la première contribution en vue de la construction du local projeté.

L'intérêt porté par le Roi Fouad 1er à la Société et Son désir de la voir définitivement établie dans son nouveau local, fit affluer 16 importantes donations de mécènes égyptiens. Dès lors, les plans furent dressés sur l'ordre du Souverain, par les soins de l'Architecte en Chef des Palais Royaux.

En Avril 1926 une nouvelle importante donation vint accroître le capital de la Société.

Les travaux de construction se poursuivirent rapidement et le 28 Janvier 1928, le Roi daigna honorer de Son Auguste présence l'inauguration du Siège permanent de la Société. A cette occasion, pour manifester Sa Haute satisfaction, Il fit un don de L.E. 1000 destiné à l'équipement des laboratoires et à l'achat d'ouvrages pour la bibliothèque.

Sa Majesté possédait une très belle collection privée d'oiseaux naturalisés recueillis en Egypte. En Février 1930, Elle en fit don à la Société. Une autre collection d'oiseaux, très importante, était en vente. Le Roi estima qu'elle compléterait utilement la première. A cet effet, Il fit adresser à la Société un chèque de L.E. 1000 qui permirent son acquisition, le reliquat devant servir à un nouvel achat d'ouvrages.

Soucieuse du développement des collections d'Histoire Naturelle de la

Société, Sa Majesté lui fit livrer un important herbier qui appartenait à la Société Royale de Géographie. Le Souverain voyait grand et sans cesse répétait : « Je travaille pour l'avenir ».

L'accumulation de toutes ces collections et l'augmentation progressive de la bibliothèque nécessitèrent l'agrandissement du nouvel édifice. Cet agrandissement reçut en 1934 l'approbation Royale, le local actuel couvre une superficie d'environ 1000 mètres carrés.

Dans Son désir de participer au mouvement scientifique universel, le Roi Fouad 1er fit représenter la Société Royale Entomologique d'Egypte à tous les Congrès Internationaux d'Entomologie qui se tinrent à l'étranger durant Son règne. Tout récemment encore, Sa Majesté accordait Son Haut Patronage à la IVème Conférence Internationale pour les Recherches Anti-Acridiennes dont les travaux se tenaient au Siège de la Société.

Tels furent les encouragements matériels que notre Société reçut de Sa Majesté ; mais Sa Sollicitude toute paternelle et Ses précieux conseils occupent une part encore plus grande dans le développement de cette Institution scientifique. Les multiples marques d'admiration que les savants du monde entier ont toujours exprimées pour l'œuvre grandiose de Sa Majesté sont un sujet de légitime fierté pour l'Egypte et une glorieuse page pour l'Histoire du Grand Règne qui vient de finir.

Qu'il nous soit permis de formuler le vœu que Sa Majesté le Roi Farouk 1er témoigne le même intérêt que Son Illustre Père pour tout ce qui concerne le progrès des Sciences, et que Son Règne continuera dignement l'œuvre du Très Regretté Fouad 1er.

Daigne le Tout Puissant veiller sur les destinées d'un Règne plein de promesses et inspirer le Nouveau Souverain dans Sa Sollicitude pour la prospérité de Son Pays.

C'est avec une émotion profonde que les membres de la Société Royale Entomologique d'Egypte ont appris la triste nouvelle du décès de leur regretté Président, feu le Docteur Mohamed Shahine Pacha.

Appartenant à la Société depuis Avril 1922, Shahine Pacha se fit bien vite remarquer par ses hautes qualités d'administrateur qui le désignèrent, en Décembre de cette même année, au fauteuil présidentiel.

Lorsqu'en 1923 la Société Royale Entomologique d'Egypte fut placée sous le Haut Patronage du Gouvernement Egyptien, nul mieux que Shahine Pacha n'était plus indiqué pour en continuer la présidence. Ce fut donc avec une satisfaction unanime que fut accueilli le Décret Royal le nommant à cette fonction honorifique qu'il garda jusqu'à la fin de ses jours.

Pendant les 13 années durant lesquelles il présida aux destinées de la

Société, Shahine Pacha sut s'acquitter de son mandat avec une courtoisie et une bonne grâce parfaites.

Toujours le premier arrivé aux séances, il savait en diriger les débats et aplanir les difficultés par ses suggestions et ses conseils.

Doué d'une activité étonnante, Shahine Pacha déploya d'inlassables efforts tendant au développement de la Société et à l'amélioration de sa situation financière. Il multipliait ses démarches auprès des pouvoirs publics et des particuliers pour les intéresser au sort de la Société et en obtenir une aide matérielle. C'est encore grâce à son initiative que notre Institut put être représenté aux divers Congrès Internationaux d'Entomologie, car, fier de l'immense progrès réalisé par son Pays dans l'étude de cette science, Shahine Pacha tenait à le mieux faire connaître à l'Etranger.

Nommé Vice-Président du Comité Local d'Organisation de la IVème Conférence Internationale pour les recherches Anti-Acridiennes, dont il devait présider les sessions et en diriger les travaux, Shahine Pacha parvint à obtenir du Gouvernement Egyptien que ce Congrès soit tenu au Siège de la Société Royale Entomologique d'Egypte. Malheureusement, deux jours avant l'ouverture solennelle de la Conférence, Shahine Pacha dut se faire hospitaliser et nous ne devions plus le revoir.

Tous ceux qui l'ont approché au cours de sa longue Présidence à la Société ont gardé de lui une profonde admiration pour sa haute valeur jointe aux qualités d'un homme aimable et bon.

Très cher et regretté Président, vous avez réalisé tous nos espoirs, notre Société est devenue une des plus belles Institutions de son genre dans le monde et une grande part de ce succès vous revient. Vos collègues du Conseil d'Administration, ainsi que tous les membres de la Société Royale Entomologique d'Egypte, s'inclinent respectueusement devant votre mémoire en un ultime hommage de gratitude pour cette contribution si importante que vous avez apportée au développement de notre chère Société.

Séance du 29 Janvier 1936

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Allocation:

Le Comité Local d'organisation de la IV^e^ Conférence Internationale pour les Recherches Anti-Acridiennes a voté une allocation de L.E. 200 devant nous permettre de prendre nos dispositions en vue de la Conférence précitée dont les travaux se tiendront au Siège de la Société. Ce montant a été versé par le Ministère de l'Agriculture.

Dons d'ouvrages:

La Société a reçu pour sa Bibliothèque:

1° De Monsieur le Marquis Saverio Patrizi, du Caire: 3 tirés à part relatifs à son expédition zoologique en Somalie italienne.

2° Du R.P. Longin Navas, de Saragosse (Espagne): 8 tirés à part de ses travaux sur les Névroptères.

3° De Monsieur le Dr. J. Carmin, de Tel Aviv (Palestine): 4 brochures traitant de l'entomologie.

4° De Monsieur le Prof. Dr. H. Priesner, du Caire: 9 tirés à part de ses travaux sur les Thysanoptères.

5° De Monsieur le Dr. Walter Innes Bey, d'Alexandrie: le fascicule Janvier 1936 de la revue ornithologique « The Ibis ».

6° De Monsieur Mohamed Taher El Sayer, du Caire: un tirage à part relatif à l'entomologie.

7° De Monsieur Walther Wittmer, de Zurich: 2 tirés à part relatifs à ses études des Malacodermes d'Egypte et du Sinaï.

8° De Messieurs le Prof. S. Metalnikov et S. S. Metalnikov (fils), de Paris: un separata de leur étude sur l' « *Utilisation des Microbes dans la lutte contre les insectes nuisibles* » (extrait des Annales de l'Institut Pasteur, Tome LV, 1935, 52 pages).

Le Conseil remercie.

Echanges:

Se font inscrire pour l'échange mutuel des publications:

1° La Bibliothèque de l'Institut et Musée Zoologique de l'Université d'Athènes.

2° La Société Entomologique de Finlande (Annales Entomologici Fennici).

Nominations :

Sur la proposition de Monsieur H. C. Efflatoun Bey et A. Alfieri, Messieurs le Dr. Mohamed Taher El Sayer, de la Section Entomologique du Ministère de l'Agriculture, et Mahmoud Hafez Ibrahim, démonstrateur à la Faculté des Sciences (Université Egyptienne), sont admis à faire partie de la Société en qualité de membres titulaires.

Description de Buprestides nouveaux de la Faune Egyptienne et remarques synonymiques

(Coleoptera)

(avec 4 Figures de Texte)

par André Théry,
attaché au Muséum National d'Histoire Naturelle,
membre honoraire de la Société Royale Entomologique d'Egypte.

M. le Professeur H. Priesner, Directeur de la Section Entomologique du Ministère de l'Agriculture d'Egypte, m'a confié l'étude d'un lot important de Buprestides égyptiens appartenant aux collections de ce Ministère. Cette collection renferme un certain nombre d'insectes recoltés par ce savant lui-même au Gebel Elba (à la frontière soudanaise, sur la côte de la Mer Rouge), région peu explorée jusqu'ici et particulièrement intéressante. Je suis très reconnaissant au Professeur Priesner de m'avoir, par cette intéressante communication, permis de continuer à faire connaître la faune si intéressante d'Egypte et d'en publier encore quelques formes nouvelles.

Liste des espèces récoltées.

Genre JULODIS

1. Julodis iris Cast. et Gory, *Mon. Bup.*, I, 1835, p. 12, pl. 3, f. 14.

Type : Egypte.

Sinaï : Ghederat, Koseima (Prof. H. Priesner, 7.V.34) ; Koseima (Juin, 1934).

Les deux exemplaires sont en tous points semblables à l'exemplaire du Museum National d'Histoire Naturelle de Paris, déterminé par Gory et ainsi étiqueté : 1° étiquette manuscrite, *iris* nobis, Egypte ; 2° étiquette imprimée, Egypte, Bové.

Cette espèce est aujourd'hui complètement méconnue.

De Marseul, *Monogr.* 1865, la cite comme propre à l'Egypte ; Gemminger & Harold, *Cat.* 1869, en font une espèce syrienne, Saunders, *Cat.* 1871, rectifie cette erreur ; de Marseul, *Cat.* 1889, continue à la considérer comme égyptienne, mais fait de *J. euphratica* C.G. une espèce également égyptienne, sans toutefois la réunir à la précédente. Kerremans, *Cat.* 1892, considère *J. iris* comme une espèce syrienne, distincte de *J. euphratica ;* dans le *Genera*

Insectorum, 1902, il réunit pour la première fois *J. iris* et *J. euphratica* comme espèces asiatiques avec, comme synonymes, *J. proxima* Gory et *J. Oberthuri*, Kerr. Dans sa *Monographie*, Tome I, il reproduit ces erreurs et ajoute un nouveau synonyme, *J. interpunctata* Thoms., espèce complètement distincte, dont le pronotum est sillonné dans sa longueur (*medio longitudin. excavatus*). Le *Coleopterorum Catalogus* (1911), au lieu de rectifier ces erreurs, les aggrave en compliquant la synonymie telle qu'elle a été établie par Kerremans, de l'apport de noms de collection : (*J. scenica* Andouin et Blanch.), cité par Kerremans *sans description*, et en créant trois sous-espèces nouvelles de *J. iris*, originaires du Beloutchistan et de l'Afganistan. Les indications de répartition géographique de *J. iris* (qu'il confond avec la variété bleuâtre de *J. euphratica*) sont complètement erronées, l'indication Egypte est accompagnée, à tort, d'un point d'interrogation et les autres indications, Asie Mineure, Perse, Afganistan, Transcaspie, Kirghise, Inde, sont fausses.

Cependant, il est facile de distinguer les deux espèces, il suffit de lire le tableau de la *Monographie* de 1865, dans laquelle de Marseul indique pour *J. iris* « front saillant en pointe au milieu de l'échancrure de l'épistome » et pour *J. euphratica* « front ne dépassant pas l'échancrure de l'épistome ».

J. iris ne saurait être séparé de *J. Lucasi* Saund., il en a tous les caractères et en diffère seulement par une coloration généralement plus claire et à reflets bleus ou irisés. Ce n'est qu'une forme locale. Il en résulte que *J. Lucasi* Saund. (1871) devient une variété de *J. iris* Cast. & Gory, 1835.

J'ai considéré *J. Lucasi* Saund. comme étant une sous-espèce de *J. aequinoctalis* Ol. (*Mem. Soc. Sc. Nat. Maroc*, XIX, 1930, p. 162), cette opinion s'applique donc à *J. iris* Cast. & Gory. J'ai indiqué le caractère qui, à mon avis, séparait les deux formes. *J. aequinoctialis*, typique, possède toujours une fossette arrondie au milieu de la base du pronotum, cette fossette manque complètement dans les formes qui en sont dérivées. *J. aequinoctialis* Ol., décrit du Sénégal, ne dépasse pas le nord du Sahara. M. Obenberger estime que ce caractère est individuel, je n'ai pas vu, parmi plusieurs centaines d'exemplaires de provenances diverses que j'ai examinés, un seul individu qui en fut privé.

Julodis floccosa Kl. — Dans le travail cité plus haut, pages 23 et 26, j'ai indiqué *J. floccosa* Kl. comme variété de *J. aequinoctialis* Ol. (1). J'ai signalé dans mon tableau ses différences et j'ai dans le texte reproduit la description de Klug. Dans *Folia Zool. & Hydrobiol.*, V, 1934, pp. 163 et 164, M. Obenberger déclare que mon exemplaire ne correspond pas à *floccosa*, mais constitue une forme nouvelle qu'il nomme *Theryella* ; d'autre part, il

(1) Le mot variété est compris ici dans un sens très large.

réunit (l.c., p. 164) *floccosa* à *aequinoctialis* comme synonyme en même temps que *J. vermiculata* Chev. Il y a là une série d'erreurs qu'il importe de relever : 1° M. Obenberger n'ayant pas vu mon exemplaire ne peut savoir s'il se rapporte ou non à *floccosa ;* 2° il a tort de faire de *floccosa* un synonyme de *aequinoctialis*, car il ne possède pas de fossette à la base du pronotum, et son pronotum est pourvu *d'une carène bien nette* signalée par l'auteur et figurée sur son dessin, alors que le pronotum de *J. aequinoctialis* n'a aucune trace de cette carène. Mon exemplaire de *J. floccosa* diffère de *J. floccosa* type par ses élytres rougeâtres et son pronotum vert, tandis que le type est entièrement vert. Comme ils proviennent tous deux d'Alexandrie, j'en conclus que mon exemplaire représente une simple aberration. Quant à *J. vermiculata* Chev., cette espèce décrite du Sahara Algérien ne diffère en rien de la forme *deserticola* Fairm., décrite antérieurement, et en est synonyme.

Genre ACMAEODERA Esch.

2. A. nivifera Ab., *Bull. Soc. Ent. Fr.*, 1914, p. 65.

Type : Aïn Sefra (Algérie).

Pyramides, W. Rashrash, W. Hataïm, Kafr Hakim, Mansouriah (sur *Alhagi*), Kerdasa.

Ces captures s'échelonnent du 14 Avril au 24 Juin, des années 1930-1934.

Espèce déjà signalée d'Egypte (Théry, *Bull. Soc. Roy. Ent. d'Egypte*, 1929, p. 171).

3. A. elevata Kl., *Symb. Physicæ*, 1829, p. 6, pl. 1, fig. 6.

Type : Ambukol (Nubie).

Gebel Elba : W. Hekwal (Prof. H. Priesner, 29.I.33, un exemplaire).

La variété *semicostata* Kerr. (Théry mss.) est semblable au type de Klug que j'ai pu voir au Musée Zoologique de Berlin. Les côtes élytrales sont atténuées vers le sommet, par contre ces côtes sont entières chez les exemplaires de Somalie et d'Afrique orientale Anglaise.

Genre STERASPIS Sol.

4. S. speciosa Kl., *Symb. Phys.*, 1929, p. 1, fig. 11.

Type : Ambukhol (Nubie).

Gebel Elba : W. Aïdeb (Prof. H. Priesner 1 & 3 Février 1933, ♂ & ♀).

Les exemplaires capturés sont typiques.

Genre PSILOPTERA Sol.

Sous-Genre Lampetis Spin.

5. L. mimosae Kl., *Symb. Phys.*, 1829, p. No. 23, pl. 2, fig. 4.

Type : Salhia, in desertis.

ab. cyanea nov.

Habitat : Helwan, 8.II.30.

Cette aberration diffère du type par sa couleur uniformément bleue avec quelques reflets d'un bleu d'acier.

Sous-Genre Damarsila Thoms.

6. D. Mac-Alisteri Wat., *Ann. Mag. Nat. Hist.*, (7) XI, 1900, p. 219.

farinosa Kerr., *Gen. Ins.*, fasc. 12, Bup., 1903, p. 96.

Bardii Obb., *Casopis*, XXIV, 1927, p. 71, fig.

Types : Northern Etbaï, Nil Blanc, Nubie ; Haute-Egypte, Suez ; Tripolitaine (*Bardii* Obb.).

Genre SPHENOPTERA Sol.

Sous-Genre Sphenoptera s.str.

7. S. Faragi nov. spec.

Long. 21 mm. ; larg. 7,5 mm. — ? ♂ : ovalaire allongé, entièrement noir sans reflets métalliques, très brillant en dessous, et sans traces de pubescence. Du même groupe que les *S. Mnizechi* Mars., *morio* Jak., etc.

Tête moyenne, peu convexe, finement ponctuée, plus fortement et plus densément à la base du front, faiblement sillonnée sur le vertex ; front plan, avec deux faibles impressions obliques entre les yeux, disposées en forme d'accent circonflexe. Epistome peu profondément échancré en arc. Antennes courtes, à 2ème article de moitié moins long que le 3ème, celui-ci le plus long de tous, le 4ème et les suivants courts, lobés et assez serrés. Carènes des cavités antennaires peu saillantes, cavités antennaires profondes, triangulaires. Yeux médiocres, étroits et elliptiques.

Pronotum transverse, près de deux fois aussi large que long, subparallèle sur les deux tiers postérieurs, rétréci en courbe sur le tiers antérieur, bisinué au bord antérieur et bordé d'une fine strie entière, finement cilié. Côtés presqu'entièrement rebordés par une carène fine et presque droite, les angles postérieurs un peu obtus, le disque déprimé au milieu, légèrement impressionné devant l'écusson, avec une fovéole peu marquée, les côtés avec une impression longitudinale, large, courte et peu prononcée, située à faible distance du bord. Surface du disque faiblement ponctuée, la ponctuation un peu plus forte sur les côtés et dans les impressions latérales. Base largement bisinuée.

Ecusson subcordiforme, arrondi en avant, à peu près plan.

Elytres un peu plus larges que le pronotum à la base, leur longueur représentant à peu près les 3/4 de la longueur totale du corps, assez convexes, un peu déprimés le long de la suture, subparallèles jusqu'après le milieu, puis assez longuement atténués en faible courbe et isolément arrondis au sommet sans aucune trace de dents apicales. Disque parcouru par des lignes ponctuées équidistantes, formées de points assez forts et égaux, les interstries plans,

Sphenoptera Faragi

nov. spec.

assez finement et densément pointillés, avec quelques rides sous l'épaule. Carène épipleurale bien marquée à l'épaule mais disparaissant après le niveau des hanches postérieures, épipleure effacés postérieurement. Prosternum finement rebordé antérieurement, bombé, éparsement ponctué sur un fond finement pointillé, la saillie à côtés parallèles, arrondie au sommet et rebordée latéralement par une strie assez profonde formée de points réunis. Métasternum sillonné, le sillon arrêté brusquement en arrière. Premier sternite *non sillonné* et assez fortement bombé au milieu, assez fortement ponctué, les suivants à peine ponctués, presque lisses et très brillants, le dernier arrondi au sommet, entouré d'un sillon entier et un peu ponctué à l'apex. Hanches postérieures dilatées postérieurement et formant un lobe postérieur interne, arrondi, pattes assez fortement ponctuées et assez brillantes, les tibias presque droits et sans caractères spéciaux.

Habitat : Koseima (Sinaï), Juin 1934.

Un autre exemplaire, qui est peut-être une ♀, se distingue du premier par sa forme plus épaisse et une fossette prononcée au milieu de la base du pronotum, les autres caractères sont identiques et cet exemplaire a été pris dans la même localité et à la même époque que le premier.

Ma collection renferme un troisième exemplaire que j'avais autrefois réuni avec doute à *S. tragacanthae* Kl. (*Bull. Soc. Roy. Ent. d'Egypte*, 1929, p. 121) ; mais cet exemplaire forme une variété distincte de *S. Faragi*, que je nomme **Alfieriana,** du nom de l'aimable entomologiste de qui je la tiens. Sa coloration est d'un noir bronzé en dessus et bronzée en dessous. *S. Faragi* se distingue des espèces du même groupe par son abdomen très brillant et non sillonné sur le 1er sternite, etc.

Sous-Genre Deudora Jak.

8. S. rauca F.

var. *vittaticollis* Luc., *Rev. Zool.*, 1844, p. 50. — Type : Algérie.
sulcata Mars., *L'Abeille*, II, 1865, p. 367. — Type : Kordofan.
aulacophora Jak., *Zuki Rossiji*, 1912, p. 784 (nom. nov. p. *sulcata* Mars.).
kordofana Kerr., *Mon. Bup.*, VI, 1913, p. 213 (pour *sulcata* Mars.).
ventrisculpta Obb., *Wien. Ent. Zeit.*, XXXV, 1916, p. 252. — Type : Biskra.

Kerdasa (1.V.30) ; Wadi Um Elek (Janvier et Mars).

La synonymie de cette *Sphenoptera* est très mal traitée dans le *Coleopterorum Catalogus*, pars 111, Bup. II, 1930, pages 239 et 249.

S. vittaticollis Luc. est mentionné comme espèce distincte, sans synonymes.

S. aulacophora Jakobson est inscrit comme nom nouveau pour remplacer *sulcata* Mars., 1865, nec Fischer 1823, mais on lui donne comme patrie : Syr Darja et Aulie Ata, bien que de Marseul ait décrit son espèce de Kordofan.

S. ventrisculpta Obb., identique à *vittaticollis* est inscrit comme espèce et sans synonymes.

Sous-genre Chrysoblemma Jak.

9. S. cylindricollis Mars., *L'Abeille*, II, 1865, p. 401.
Henoni Fairm., *Ann. Soc. Ent. Fr.*, 1866, p. 26.
var. *Alfredi* Reitt., *Deutsche Ent. Zeits.*, 1900, p. 85.
Type : Biskra (*Alfredi* Reitt.), Mezzouna, Tunisie.

var. Priesneri nov. — Vert, avec les élytres d'un pourpré violacé.
Sinai : Koseima (Juin 1934).
Cette espèce est nouvelle pour l'Egypte. Le type est vert et la variété *Alfredi* Reitt., rouge feu.

10. S. Scovitzi var. Alfierii Obb., *Casopis*, T. XIX (1923), p. 81 ; Théry *Ann. Soc. Ent. Belg.*, 1926, p. 154 ; Théry, *Bull. Soc. Roy. Ent. Egpyte*, 1926, p. 125 ; Obenberger, *Arch. f. Nat.*, Abt. A. 1926 (1928), p. 35 ;

Obenberger, *Ann. Soc. Ent. Belg.*, 1928, p. 103 ; Théry, *Mém. Soc. Sc. Nat. Maroc*, XIX, 1928 (1930), pp. 222, 239, 552.

Type : Meadi (Egypte).

Helwan (21.VII.1934) ; Sinaï : Ghederat (Prof. Dr. H. Priesner, 7.V. 1934).

11. S. dongolensis Kl., *Symb. Physicae* (1829), No. 31, pl. 3, fig. 5.

Pour la synonymie de cette espèce voir : Théry, *Bull. Soc. Roy. Ent. d'Egypte*, 1929, p. 347.

Type : Dongola.

Egypte : Mansouriah (16.V.1934) ; Abu Rawash (5.X.1932).

11 bis. S. mauretanica Théry, *Mém. Soc. Sc. Nat. Maroc*, 1928 (1930), p. 200.

Type : Tozeur, Tunisie.

Des exemplaires de cette espèce, non encore signalée d'Egypte, m'ont été communiqués par Monsieur A. Alfieri. Ils proviennent du Wadi Feiran (Sinaï sud) où ils ont été capturés par Monsieur A. Rabinovitch en fin Mai 1935.

12. S. Kasimi nov. spec.

♂ : long. 10,75 ; larg. 4,3 mm. — Court, large, très atténué postérieurement, d'un bronzé cuivreux clair en dessus et en dessous, les tarses verdâtres ainsi que le labre et les antennes à l'exception des deux premiers articles ; glabre en dessus et légèrement pubescent en dessous.

Tête moyenne, à ponctuation assez forte et irrégulière, finement striée sur le vertex. Carènes des cavités antennaires se réunissant en avant et formant une carène transversale droite séparant le front de l'épistome ; le milieu du front avec deux reliefs lisses en accent circonflexe. La partie du front située entre les yeux, plus large que haute, ses côtés légèrement convergents vers le haut. Yeux moyens, régulièrement elliptiques, modérément saillants. Epistome droit au bord antérieur. Antennes atteignant à peu près le milieu de la longueur du pronotum, dentées à partir du 4ème article, la 2ème article un peu plus long que large, le 3ème sensiblement plus long que le 2ème, le 4ème régulièrement triangulaire, les suivants plus larges que longs.

Pronotum environ deux fois aussi large que long, ayant sa plus grande largeur à la base, régulièrement arqué sur les côtés, ceux-ci rebordés par une carène courbe atteignant presque le bord antérieur, et visible de dessus sur sa moitié postérieure, le bord antérieur droit et rebordé par une fine strie entière, très rapprochée du bord, les angles postérieurs très aigus et contournant légèrement les épaules. Disque régulièrement bombé, couvert de points assez forts, assez irrégulièrement dispersés, sur un fond microscopiquement ponctué ; la ligne médiane avec un très faible sillon longitudinal visible seulement en regardant l'insecte obliquement, sous un certain jour.

Ecusson plus large que long, subcordiforme, sans ponctuation distincte.

Elytres une fois et un 8ème plus longs que larges, à peine plus larges aux épaules que le pronotum, et y ayant leur plus grande largeur, rétrécis en courbe régulière jusqu'à l'apex où ils sont tridentés. Carène épipleurale entière, visible de dessus sur toute sa longueur, légèrement en gouttière à la base, l'épipleure étroit et légèrement concave, le disque couvert d'une ponctuation microscopique extrêmement fine et visible seulement à un fort grossissement, avec des lignes de points assez gros mais peu profonds, dont les intervalles sont bombés, les intervalles pairs sont élevés en côtes sur toute leur longueur, une strie scutellaire nette et profonde occupe le tiers de la longueur ; la suture est rebordée sur le tiers postérieur.

Sphenoptera Kasimi

nov. spec.

Prosternum tronqué et finement rebordé, au bord antérieur ; saillie prosternale arrondie à l'extrémité, rebordée par une forte strie non interrompue au sommet, sillonnée dans sa longueur avec quelques points au fond du sillon. Metasternum parcouru par un étroit sillon longitudinal. Hanches postérieures assez larges, droites au bord antérieur, sillonnées au bord postérieur, avec le lobe postero-interne, dentiforme. Abdomen très finement ponctué, sauf dans les angles antérieurs des sternites qui cependant ne forment pas de reliefs brillants, distincts. Les deux premiers sternites étroitement sillonnés, les bords du sillon presque carèniformes sur le premier sternite. Dernier sternite arrondi à l'extrémité, avec un bord pleural très étroit et imperceptiblement sinué à l'apex. Pattes grêles, tibias antérieurs légèrement arqués et munis d'une série de soies raides, tibias intermédiaires et postérieurs presque droits, les tarses intermédiaires presqu'aussi longs que les tibias, les postérieurs un peu plus courts, l'apex des tibias non mucroné intérieurement.

Habitat : Amria (Mariout), capturé par M. Kasim le 11.VII.1934. Je crois que cet exemplaire est un ♂,

Un autre exemplaire, qui me paraît une ♀, diffère du premier pas les caractères suivants : Taille plus grande et encore plus large, labre concolore, élytres à interstries régulièrement égaux et ne formant pas de côtes sur les intervalles pairs, tous les tibias presque droits. Cet exemplaire, qui provient de Burg et Arab (Mariout), se trouve actuellement dans ma collection. Il me paraît appartenir certainement à la même espèce que le précédent.

Sous-genre Hoplistura Jak.

13. S. nitens Kerr., *Ann. Soc. Ent. Belg.*, T. 42 (1898), p. 118.

Type : Aden.

Egypte : Gebel Elba (Prof. H. Priesner, Janvier et Février 1933).

14. S. gossypii Cotes, *Ind. Mus. Notes*, T. II (1891), p. 33.

Type : Indes Orientales.

Egypte : Wadi Cansirob (Gebel Elba), capturé par le Prof. H. Priesner le 25.I.33.

L'exemplaire communiqué est en mauvais état et sa détermination n'est pas certaine, faute de tarses et d'antennes ; mais cependant, il me paraît bien appartenir à cette espèce dont la présence en Afrique est aujourd'hui établie (Théry, *Bull. Soc. Sc. Nat. du Maroc*, T. X, No. 1–6, 1930, p. 54.

15. Spenoptera sp. ?

Un exemplaire, capturé à Wadi Feiran (Sinaï) par M. Kasim, me paraît appartenir à une espèce nouvelle ; mais l'absence de pattes et d'antennes ne me permet pas de le décrire. Il représente cependant une forme intéressante, son aspect rappelle le genre *Chrysoblemma*, la ponctuation élytrale est particulièrement épaisse et l'apex est armé de trois très fortes épines.

Genre ANTHAXIA Esch.

16. A. angustipennis Klug, *Symb. Physicae*, I (1829), No. 36, pl. 3, f. 10.

Type : Ambukohl, Egypte.

Capturé de Mai à Juin dans les localités suivantes : Oasis de Dakla. Helwan, Warrak-el-Hadi, Abu Rawash, Pyramides, Kerdaça, Beni-Suef.

Les indications suivantes des végétaux sur lesquels les exemplaires ont été capturés, sont sans doute accidentelles : herbes, alfa et *Zygophyllum*.

Cette espèce est parasite de différentes espèces d'*Acacia*. Elle vivrait aussi, d'après Willcocks, au dépens de *Ziziphus spina-christi*. Elle habite l'Egypte, la Tunisie, l'Algérie, l'Asie occidentale, mais n'est pas encore si-

gnalée du Maroc où elle se rencontrera sans doute, des exemplaires ayant été capturés au Rio de Oro par Chudeau (1911).

Genre DISCODEROIDES nov.

Caractères. — Tête médiocre, sillonnée sur le front et le vertex. Epistome fortement étranglé entre les cavités antennaires, faiblement dilaté antérieurement. Cavités antennaires grandes, surmontées d'une coulisse arquée. Yeux assez grands, faiblement saillants, régulièrement elliptiques, touchant le bord du pronotum, leurs bords antérieurs, vus de face, fortement divergents vers le haut. Antennes de 11 articles, courtes, dentées à partir du 5ème article. Joues inermes. — Pronotum grand, modérément bombé, la marge antérieure saillante et anguleuse, les côtés sinueux, la base avec un grand lobe arrondi, le disque inégal. — Ecusson grand, triangulaire. — Elytres déprimés sur le disque, moins larges que l'abdomen, leur épipleure faiblement dilaté à l'épaule, l'apex non denticulé. — Marge antérieure du pronotum munie d'une forte mentonnière, cette mentonnière coupée, de chaque côté,

Discoderoides nov. gen.

Priesneri nov. spec.

par une échancrure peu prolongée postérieurement, logeant l'antenne. Saillie prosternale large, triangulaire au sommet. — Pattes courtes, les tibias dilatés en lame sur leur bord postérieur, les postérieurs ciliés. Tarses courts et serrés, crochets dentés à la base.

Corps faiblement atténué en avant et en arrière, recouvert d'une pubescence formant des dessins.

Ce genre se place près du genre *Discoderes* Chev., dont il a le faciès. Il en diffère par la présence d'une mentonnière, l'échancrure livrant passage aux antennes, située de chaque côté de la mentonnière, enfin par ses tibias dilatés en forme de lame, sur leur bord postérieur.

Geno-Type : *Discoderoides Priesneri* mihi.

17. Discoderoides Priesneri nov. spec.

Longueur 6,5 mm., largeur du pronotum 2, 1 mm., largeur au tiers postérieur des élytres 2,2 mm., ? mâle ; peu atténué aux extrémités, entièrement bronzé, avec des dessins formés de poils blonds, très brillants, entremélés, vers l'arrière, de quelques poils roux ; les parties foncées entre les dessins clairs, paraissant glabres. La pubescence forme, sur le pronotum, quelques vagues taches arrondies peu distinctes et, sur les élytres, des fascies ainsi disposées : 1° un peu avant le milieu, deux cercles situés de part et d'autre de la suture et la touchant, 2°, vers le tiers postérieur une fascie transversale extrêmement sinueuse, 3°, avant l'apex, deux fascies transversales parallèles et assez peu sinueuses. En dehors de ces dessins se trouvent quelques poils blonds clairs dispersés ou plus ou moins réunis, donnant à l'ensemble du dessus un aspect un peu grisâtre.

Tête (largeur 1,5 mm.) assez bombée, légèrement sillonnée sur le front et le vertex, recouverte d'une pubescence blonde, un peu laineuse, qui en cache la sculpture. Antennes dépassant à peine le bord antérieur du pronotum, le 2ème article de moitié plus long que le 3ème, ce dernier égal au 4ème, les suivants beaucoup plus larges que longs et dentés en ogive.

Pronotum un peu moins de 1 fois 1/4 aussi large que long (1,7 mm.), faiblement rétréci en avant, avec le bord antérieur fortement et anguleusement saillant, les côtés arrondis en avant, puis fortement sinués au tiers postérieur, arrondis ensuite à la base et rebordés par une carène entière, tranchante, légèrement sinueuse en arrière, avec les angles antérieurs abaissés et très aigus, les postérieurs complètement arrondis ; la base bisinueuse avec un large lobe médian arrondi. Disque inégal, bombé en avant avec une petite impression au milieu de la partie bombée, impressionné en arrière et dans les angles postérieurs, le milieu des côtés avec une petite carène arquée, brillante, ne touchant le bord latéral ni en avant ni en arrière ; toute la surface couverte de rides concentriques autour du milieu de la partie bombée antérieure.

Ecusson grand, en triangle à côtés droits, plus large que long.

Elytres un peu moins de 2 fois 1/3 aussi longs que larges, pris ensemble (4,6 mm. × 2 mm., bord pleural de l'abdomen non compris), arrondis aux épaules, sinués latéralement de l'épaule au tiers postérieur, puis atténués, d'abord en faible courbe vers l'arrière, puis brusquement, avant le sommet, où ils sont isolément arrondis et sans traces de denticulation. Disque aplani au milieu et déclive sur les côtés et à l'apex. Les élytres sont bordés latéralement par un fin bourrelet épipleural très net et prolongé jusqu'à l'apex, avec l'épipleure très étroit postérieurement, uni-sérialement ponctué et distinct jusqu'à l'extrémité. Suture finement rebordée sur sa moitié postérieure. Le disque est recouvert en avant, jusqu'à la première fascie, de fortes rides transversales, ensuite il paraît grossièrement ponctué, mais la pubescence cache plus ou moins la sculpture.

Dessous transversalement ridé, plus fortement en avant. Prosternum muni d'une grande mentonnière à peine sinuée au milieu, cette mentonnière est coupée, presque perpendiculairement, de chaque côté, par une échancrure de l'épisterne, destinée au passage de l'antenne, mais cette échancrure est peu profonde et ne se prolonge guère au delà du niveau du bord vrai du prosternum. Saillie prosternale large, rugueuse, légèrement dilatée au sommet. Hanches postérieures anguleusement échancrées au tiers interne du bord postérieur, l'angle postéro-externe arrondi et non redressé. Saillie intercoxale du premier sternite abdominal large, en ogive et rebordée. Suture des deux premiers sternites invisible au milieu, les deux premiers sternites plus longs, ensemble, que les trois suivants réunis. Le bord pleural des trois premiers sternites largement visible en dessus. Les sternites 3 et 4 sont séparés de leur bord pleural par une coulisse entière, les deux premiers sternites en sont séparés simplement par la carène pleurale, le dernier sternite est faiblement sinué à l'apex et nettement denticulé, il est séparé de son bord pleural par un sillon, ce bord pleural est lui même faiblement sinué et parcouru par quelques stries circulaires très nettes et parallèles. L'extrémité du pygidium est pourvue d'un mucron cylindrique peu visible parcequ'il ne déborde pas le niveau du bord du dernier sternite. Pattes courtes, les tarses courts à articles courts et subégaux, les crochets fortement dentés à la base. Tibias antérieurs droits, carénés extérieurement dans leur longueur, aplatis en lame tranchante sur presque toute leur longueur ; tibias intermédiaires construits sur le même plan, mais avec la partie dilatée en lame, plus courte, tibias postérieurs brusquement élargis en lame sur leur moitié postérieure seulement, la lame bordée d'un peigne de petites épines médiocrement serrées et très régulières.

Habitat : Gebel Elba (Prof. H. Priesner, 24 et 29.I.1933, 2 exemplaires).

Genre MELIBOEUS H. Deyr.

18. M. impressithorax Pic, *Bull. Soc. Royale Ent. d'Egypte*, 1923, p. 54.

Type : Ougret-el-Sheikh (Alfieri, en Juin).

El Timid (Kasim, 25.V.1935, trois exemplaires).

18 bis. M. aureolus Abeille, *Rev. Fr. Ent.*, Caen, T. XII. (1893), p. 139.

Type : Montagne de Sable à Biskra (Algérie).

Cette espèce avait été reprise dans le Hoggar (Sahara algérien) par P. de Peyerimhoff, mais n'avait pas encore été signalée d'Egypte. Monsieur A. Alfieri m'a communiqué des exemplaires capturés à Wadi el Guederat (Nord du Sinaï) par Monsieur A. Rabinovitch.

Genre AGRILUS Curt.

19. A. lituratus Kl., *Symb. Phys.*, 1829, pl. 1, f. 13.

Type : Ambukohl, en Août.

Nahia (10.IX.1933), El Warrak (25.V.1932), Dakla Oasis (Prof. H. Priesner, 20.III.1932), Gebel Elba (Prof. H. Priesner, 20.III.1932 et 22.I.1933).

Cette espèce vit sur l'*Acacia gummifera* Willd. et peut-être sur d'autres *Acacia*. Elle se trouve en Egypte, au Soudan (Khartoum : H. W. Bedford), dans le Grand-Atlas Marocain (P. de Peyerimhoff) et aux Indes.

20. A. purpuratus Kl., *Symb. Phys.*, L. 12, Pl. 1, fig. 12.

Type : ex Arabia deserta (Klug).

Synonyme : *A. Pharao* Obb., *Act. Soc. Tchecoslov.* (1923), p. 5 (Sép.).

Gebel Elba : Rabdat (Prof. H. Priesner, 21.I.1933, un seul exemplaire).

L'exemplaire communiqué est semblable au Type de *A. Pharao* Obb. Ce type correspond entièrement à la description et à la figure de Klug, et bien que je n'ai pas vu le type de cet auteur, je suis convaincu qu'il n'y a là qu'une seule et même espèce.

Genre CLEMA Sem.

21. C. deserti ssp. Rabinovitchi Théry, *Bull. Soc. Roy. Ent. d'Egypte*, T. XIX (1935), p. 151.

Type : Sakkara, 23.V.33 (2).

Pyramides (30.V.34).

Genre APHANISTICUS Latr.

22. A. aegyptiacus Théry, *Mem. Soc. Sc. Nat. Mar.*, T. XIX, 1928 (1930), p. 510.

Type : Egypte.

Nombreuses captures de Janvier à Octobre, dans les localités suivantes : Marg (30.I.33, sur l'Alfa), Abou Rawash (13.V.33, sur l'Alfa), Warrak el Hadr (13.V.32, sur l'Alfa), Embaba (5.VI.33, sur l'Alfa), Giza (2.VII.33, sur pomme-de-terre), El Warrak (28.VII.33, sur l'Alfa), Helwan (29.VIII.31, sur cotonnier), Helwan (1.X.32, sur canne à sucre).

La présence de cet *Aphanisticus* sur le cotonnier, la pomme-de-terre, et peut-être aussi sur la canne à sucre, semble être accidentelle.

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(2) J'ai omis d'indiquer l'habitat du type quand j'ai décrit cet insecte, je répare ici cet oubli.

Neue Koleopteren aus Aegypten und dem Sinaï aus der Sammlung des Museums "Pietro Rossi", Duino

von W. Wittmer, Bottmingen b/Basel.

Chrysomelidae.

Cyaniris viridana subspec. marioutensis nov.

Stimmt in der Punktierung und der Form der Fühler vollkommen mit der Stammform überein. Unterscheidet sich von dieser durch die mehr ins blaue übergehende Gesamtfärbung und konstant durch die geringere Grösse, fast nur halb so gross wie die Stammform. Länge 3,5 mm.; Breite 1,4 mm. *C. viridana* f.t. misst dagegen 5-6 mm. in der Länge und 2,25-2,5 in der Breite. Der Penis ist dem der Stammform ähnlich, aber um ca. 1/3 kleiner.

Fundorte: El Borg (Mariout) 13-16.2.1925 und 7-8.3.1925, Mariout 15.3.1914.

Type und Cotypen im ägyptischen Ackerbauministerium von Kairo und Museum « Pietro Rossi » Duino (Trieste).

Phyllotreta Springeri nov. spec.

Schwarz, Oberseite mit grünem oder blauem Metallglanze.

♂ Kopf mit den Augen schmäler als der Halsschild vorne. Stirne zerstreut punktiert mit ca. 20-25 Punkten besetzt, etwas tiefer punktiert als der Halsschild. Stirnkiel deutlich abgesetzt. Fühler länger als der halbe Körper. Erstes Fühlerglied sehr langgestreckt, zur Spitze schwach verdickt, fast so lang wie das 2. bis 4. zusammen; 2. Glied länglichoval, so lang wie das 3.; 3. zur Spitze stark verbreitert, an der Spitze mehr als doppelt so breit wie an der Basis; 4. so lang wie das 3. ein wenig breiter als lang; 5. das breiteste, so lang wie die beiden vorhergehenden zusammen, um die Hälfte länger als breit, zur Spitze kaum stärker als zur Basis verengt; 6. so lang wie das 2., zur Spitze leicht verbreitert; 7. bis 10. unter sich von fast gleicher Länge, an der Spitze nur wenig breiter als an der Basis, 11. Glied um 1/3 länger als das vorhergehende. Halsschild etwas mehr als 1 1/2 mal so breit wie lang. Seiten gerundet, fast gleichmässig verengt, Vorderecken leicht aufgebogen, Punktierung schwächer als die der Flügeldecken. Flügeldecken breiter als der Halsschild, mit stark hervortretenden Schulterbeulen und fast parallelen Seiten. Punktierung auf der Scheibe am stärksten, gegen die Spitze schwächer.

♀ Flügeldecken etwas breiter als die des Männchens, Fühler einfach. Erstes Glied fast so lang wie das 2. bis 4. zusammen; 2. bis 4. jedes von gleicher Länge, das 2. ist etwas dicker als die nächsten; 5. Glied um die Hälfte länger als das 4.; 6. so lang wie das 4., aber etwas dicker; 7. bis 10. unter sich gleich lang, jedes eine Spur länger als das 6.; 11. länger als das 10. Länge: 2 mm.

Fundort: Wadi Hebran (Sinai) 6.3.1935.

Typen ♂♀ in der Sammlung des Museums «Pietro Rossi»; Cotype in der Sammlung des Herrn Dr. G. Springer, Trieste.

Verwandt mit *Ph. consobrina* Curt. Die Fühler bei der neuen Art sind länger, das erste Glied ist um 1/4 länger als bei *consobrina;* das 4. so lang wie breit, bei *consobrina* etwas länger als breit; das 5. Glied bei *Springeri* fast doppelt so breit wie bei *consobrina*. Die Flügeldecken sind paralleler die Schulterbeulen noch stärker entwickelt und treten noch mehr hervor als bei *consobrina.*

Dem bekannten Kenner der Halticinae, Herrn Dr. G. Springer gewidmet.

Alleculidae.

Cteniopus (Ctenoposomus) Priesneri nov. spec.

♂ Kopf schwarz, Clypeus und Oberlippe aufgehellt, Halsschild gelb, Vorderrand und Seitenränder in der vorderen Hälfte braun gesäumt, Flügeldecken einfarbig gelb. Beine gelb, Basis aller Tibien und die vier Hintertarsen angedunkelt. Behaarung gelblich.

Kopf schmäler als der Halsschild, stärker als dieser punktiert, zwischen den Augen eingedrückt und an dieser Stelle sparsamer punktiert. Fühler lang, das 3. Abdominalsegment erreichend. 1. Glied verdickt, doppelt so lang wie das 2., 3. fast 2 1/2 mal so lang wie das 4. 4. bis 10. jedes von gleicher Länge, 11. etwas länger als das 10. Halsschild schmäler als die Flügeldecken etwa um die Hälfte breiter als lang, in der Mitte am breitesten, nach vorne gerundet verengt, Basalecken rechtwinklig, etwas abgerundet. An der Basis jederseits neben dem Schildchen leicht eingedrückt. Halsschild ohne Mittellinie. Seitenrand nur bis zur Mitte deutlich, Punktierung gedrängt. Schildchen dreieckig, braun. Flügeldecken 2 1/2 mal so lang wie an den Schultern breit, ohne deutliche Punktierung, äusserst fein skulptiert, mit angedeuteten schwachen Längsstreifen. Analsternit in der Mitte ausgehöhlt mit wenig langen Seitenlappen.

♀ Gelb, nur die Stirne, die Mundwerkzeuge, die Knie und Hintertarsen sind mehr oder weniger gebräunt, Fühler schwarz, das Basalglied ist etwas aufgehellt. Fühler bedeutend kürzer als die des Männchens, sie erreichen kaum die Koxen der Hinterbeine. Der Halsschild ist etwas länger als beim Männchen.

Länge: 5,5-6,5 mm.

Fundort: Wadi Gederat (Sinai), 8.5.1934 (leg. Dr. H. Priesner).

Mit *C. Bodemeyeri* Rtt. verwandt. Der Kopf ist bei der neuen Art dichter punktiert. Der Halsschild (♂) ist gelb, die Mittellinie fehlt vollständig, bei *Bodemeyeri* ist der Halsschild dunkel, gelb gesäumt mit deutlicher Mittellinie. Die Fühler bei *Priesneri* ♂ sind viel länger, überragen die Koxen der Hinterbeine deutlich, bei *Bodemeyeri* erreichen die Fühler die Koxen der Hinterbeine nicht. Das Analsternit ist bei *Bodemeyeri* gelblich, viel stärker ausgeschnitten, die Seitenlappen sind länger, der Penis ist 3 mal so gross als bei *Priesneri;* das Analsternit ist bei der neuen Art dunkel gefärbt.

Die Weibchen unterscheiden sich von *Bodemeyeri* durch kleinere Gestalt, weniger breiten und ungefurchten Halsschild.

Dem Entdecker Herrn Prof. Dr. H. Priesner in Kairo gewidmet.

Un Sphinx nouveau pour l'Egypte: *Theretra alecto* ssp. *cretica* Boisd.

(Lepidoptera-Sphingidae)

par Alexandre Petroff

En Septembre 1932, durant mon séjour dans les montagnes de Judée (Aïn-Karem) aux environs de Jérusalem, dans une localité riche en vignobles, je pus capturer un exemplaire de ce beau papillon. Il avait été attiré par la lumière et fut pris dans ma chambre.

Il est à noter que j'ai résidé à Jérusalem de 1901 à 1905 et que je chasse assez régulièrement en Egypte depuis 1910 sans toutefois avoir pu observer cette espèce avant 1932. De plus, autant que je sache, il n'est nulle part fait mention de la présence de *Theretra alecto* ssp. *cretica* Boisd. sur le territoire égyptien. En effet, cette espèce ne figure pas sur les listes des Lépidoptères d'Egypte publiées par le regretté Adolf Andres dans le Bulletin de la Société Entomologique d'Egypte, année 1912, et par le même, en collaboration avec A. Seitz, dans les « Senckenbergiana » de Francfort s-M., Vol. V, 1-2, 1923 et Vol. VII, 1-2, 1925.

Il est cependant certain que depuis quelque temps *Theretra alecto* ssp. *cretica* Boisd. n'est pas rare à Ramleh, banlieue d'Alexandrie.

En Août 1934 je trouvai, sur un plant de vigne garnissant la véranda de ma villa à Saba-Pacha, quelques chenilles d'un Sphingide qui m'étaient totalement inconnues. Leur couleur rouge-brun rappelait les chenilles de *Hippotion celerio* L., mais elles étaient plus grandes, avec un plus grand nombre d'ocelles sur les premiers segments et avec une corne plus courte et plus épaisse. Il m'était alors impossible d'établir à quelle espèce ces chenilles pouvaient bien appartenir, car elles différaient de toutes celles qui m'étaient connues. Il me fut également impossible de procéder à leur élevage, ayant dû m'absenter d'Alexandrie peu de jours après pour un assez long temps.

Au printemps de l'année 1935, je trouvai sur la terre, dans le voisinage de la véranda, une chrysalide de Sphingide, ressemblant à celle de *Hippotion celerio* L., caractérisée par le front terminé par une excroissance tranchante servant d'étui à la trompe. Ici cependant, cette excroissance était bien plus accentuée, et la taille de la chrysalide était également plus grande comparée à celle des plus grands spécimens de *Hippotion celerio* L. De cette chrysalide j'obtins, au mois de Mai, un Sphingide nouveau pour l'Egypte: *Theretra alecto* ssp. *cretica* Boisd.

A cette même époque, je constatais à plusieurs reprises, sur la véranda, le vol de quelques Sphingides de cette même espèce, autour de ma vigne, sans toutefois réussir à en capturer un seul.

En Août, on m'apporta un exemplaire de *Theretra alecto* ssp. *cretica* Boisd. qui venait d'être capturé au Sporting.

Cette même année, je n'observai plus de chenilles sur ma vigne ; mais en Octobre, je trouvai une chrysalide dans un pot d'*Asparagus Sprengeri* placé sur la véranda, au ras du sol. Une autre chrysalide me fut apportée du Sporting à la même époque.

De ces observations, je puis conclure que *Theretra alecto* ssp. *cretica* Boisd. fait en Egypte deux apparitions par an : la première a lieu en Mai-Juin, de chenilles écloses en Août-Septembre et dont les chrysalides, dépourvues de cocon, ont hiverné au ras du sol, dans des endroits retirés ; la seconde apparition a lieu en Août-Septembre, de chenilles écloses en Juin-Juillet.

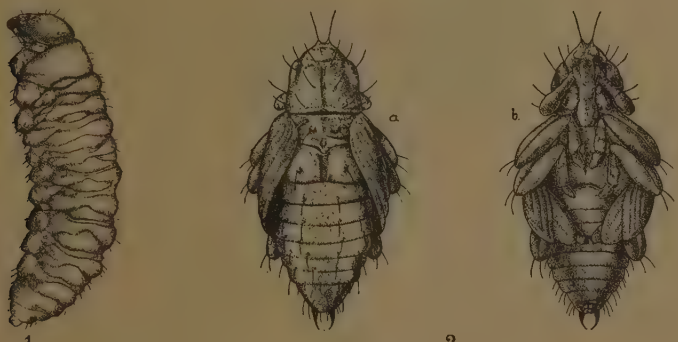
Les deux exemplaires égyptiens de *Theretra alecto* ssp. *cretica* Boisd., que je possède, ne diffèrent en rien de celui pris en Palestine. Ils correspondent à la description donnée par le Dr. K. Jordan dans le monumental ouvrage de Seitz « Les Macrolépidoptères de la Faune Paléarctique », Vol. 2, pages 258-259 et « Supplement », Vol. 2, page 154, auxquels on pourra se référer.

Sur deux Rhynchophores galligènes

(Coleoptera-Curculionidae)

par ANASTASE ALFIERI

Au mois de Juillet 1926 Monsieur W. J. Hall m'apportait plusieurs plants de *Portulaca oleracea* Linné (1) cueillis à Maadi (environs du Caire) sur une terre inculte. Leurs tiges étaient déformées par des renflements noueux ou cécidies. La vaste répartition géographique de cette plante supposait une affection connue et déjà décrite, mais les nombreuses recherches bibliographiques entreprises depuis lors ont prouvé qu'il s'agit d'une forme phytopathologique nouvelle.



1 2

Fig. 1. — Larve de *Baris* (*Aegyptobaris*) *arctithorax* Pic, vue de côté. — × 12.5.

Fig. 2. — Nymphe de *Baris* (*Aegyptobaris*) *arctithorax* Pic : a. vue de dos, b. vue de dessous. — × 12.5.

La Figure 3 montre l'aspect d'un plant déformé par les cécidies et remplace avantageusement une description aussi bonne qu'elle soit.

L'intérieur des cécidies comporte une galerie larvaire, d'environ deux millimètres de diamètre, dont les parois se lignifient progressivement au fur et mesure de la croissance des larves. Quoique jamais prononcée, cette lignification atteint son point culminant dans la chambre nymphale où la

(1) C'est le pourpier (*rigl* en arabe), plante potagère cosmopolite. En Egypte, elle croît un peu partout, cultivée ou comme mauvaise herbe. P. Ascherson et G. Schweinfurth la citent également des oasis libyques et du désert septentrional.

nymphose a généralement lieu, bien que parfois les larves quittent les galeries et terminent leur cycle évolutif en terre.

Fig. 3. — Plant de *Portulaca oleracea* Linné illustrant la déformation des tiges. — Grandeur naturelle.

Un examen du contenu des cécidies, effectué le 25 Juillet, révélait que la plupart des larves assumaient déjà la forme nymphale. L'éclosion massive des adultes eut lieu du 1er au 16 Août. Il s'agissait du *Baris* (*Aegyptobaris*) *arctithorax* Pic (2) dont les Figures 1, 2 et 4 donnent une bonne illustration de la larve, de la nymphe et de l'adulte.

(2) Du groupe des Baridinae et décrit dans *Miscellanea Entomologica*, vol. VII, 1899, p. 140, du Caire et d'Assouan.

Contemporainement aux éclosions de *Baris* (*Aegyptobaris*) *arctithorax* Pic, deux exemplaires d'*Hypurus portulacae* Hustache (3) furent également obtenus des cécidies. La Figure 5 illustre cette espèce qui, quoique rare, provo-

4 5

Fig. 4. — *Baris* (*Aegyptobaris*) *arctithorax* Pic. — × 12.5.
Fig. 5. — *Hypurus portulacae* Hustache. — × 12.5.

que sans doute sur la *Portulaca oleracea* Linné des cécidies de même nature que celles du *Baris* (*Aegyptobaris*) *arctithorax* Pic.

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(3) La description de cette espèce de Ceutorrhynchinae-Hypurini, publiée dans *Bull. Soc. Roy. Ent. Egypte*, vol. X, 1926, p. 262, termine par la mention « obtenu de cécidies de *Portulaca oleracea* ». Il s'agit, évidemment, des deux exemplaires ci-haut mentionnés (les types), que j'avais communiqués à l'époque à l'examen de Monsieur A. Hustache.

Notes sur l'accouplement des Courtilières

(Orthoptera-Gryllotalpidae)

par Antoine Cassab

L'habitat souterrain de la courtillère rend particulièrement compliquées les investigations relatives à son accouplement. Durant nos multiples élevages, ces insectes firent souvent leur parution en surface, mais aucune tentative d'accouplement ne put y être observée, bien que par la suite de nombreuses pontes furent constatées dans leurs galeries. Il fut donc indispensable de modifier le type des cages d'élevage employées jusqu'alors.

Les caractéristiques des nouvelles cages adoptées furent les suivantes : dimensions $30 \times 20 \times 16$ centimètres de hauteur, couvercle entièrement muni de toile métallique à mailles très serrées afin d'atténuer la lumière du jour qui paraît incommoder les courtilières, fond recouvert d'une couche de terre des jardins de 1 à 2 centimètres d'épaisseur. Cette dernière disposition obligeait les courtilières d'évoluer presque à découvert et permit le succès de nos recherches.

Nos observations portent sur dix couples adultes de *Gyrllotalpa gryllotalpa* Linné forme brachyptère (=*cophta* de Haan), mis en cage en Février, chaque couple séparément.

Au début de leur internement, nos pensionnaires étaient craintifs et agités, mais ils ne tardèrent pas à s'accoutumer à l'ambiance et aux conditions qui leur étaient imposées. Les voici en train d'inspecter leur petit domaine, vaquer à des travaux d'excavation, enfouissant leur tête dans la terre qu'à dessein nous maintenons régulièrement et uniformément humide. Ils se nourissent des diverses substances alimentaires quotidiennement placées dans les cages, notamment de riz concassé, vers de terre, tubercules de toutes sortes. Cet état de choses dure jusqu'au 18 Avril, sans changement digne de mention. Ce jour-là, vers les 11 heures, j'eus pour la première fois l'occasion d'observer l'accouplement chez la courtilière. Depuis, bien souvent il me fut donné d'assister à leurs ébats amoureux, qui assumèrent un caractère assez constant durant l'acte et dans la position des couples en cette circonstance.

Les avances émanent du mâle et débutent par un appel consistant dans l'émission d'un son (1) mélodieux et répété. Puis viennent les travaux

(1) Le son émis par les courtilières est dû uniquement au frottement des élytres entre eux et l'on comprend aisément, à l'examen de ceux-ci, que si les individus des deux sexes ont la faculté de se faire entendre, les mâles sont pour celà mieux outillés.

d'approche. Le mâle s'avance vers la femelle, antennes projetées en avant et alternativement agitées en tous sens. Il tourne plusieurs fois autour d'elle, ses antennes tâtent celles de son élue et le voici essayant de s'implanter sous elle. Mais celle-ci n'agrée pas toujours ces avances. Dans ce cas, elle se met en état de défense, repousse l'importun, prend la fuite. C'est alors la poursuite, longue et tenace. A cette course, le mâle s'exténue, doit prendre quelques instants de repos. Puis la poursuite recommence, avec de nouvelles alternatives d'arrêt. Cependant, la femelle n'est guère mieux disposée. Le mâle, las de tant d'efforts inutiles, abandonne alors la partie et se réfugie dans un coin de la cage. A l'autre bout, craintive et méfiante, la femelle se tient immobile, antennes projetées en avant : elle est sur ses gardes, observe l'importun. Puis, jugeant sans doute qu'elle n'a plus rien à craindre, elle se met en mouvement et vaque à ses occupations habituelles.

Lorsque la femelle est consentante, et c'est habituellement le cas, aux avances du mâle décrites plus haut, elle soulève délibérement ses pattes, permet à celui-ci de s'insinuer sous elle, ou bien le chevauche d'elle-même. Le mâle relève alors le bout de son abdomen à l'aide duquel il tâte celui de sa compagne, repère la vulve et y introduit son pénis. Le couple reste ainsi accolé durant 1-3 minutes et l'acte a pris fin.

Rien de précis ne m'est connu sur l'accouplement des courtilières à l'état libre. Il est a présumer que l'acte est accompli dans les conditions décrites ci-dessus.

Il résulte également de nos observations que les courtilières s'accouplent indifféremment à toute heure du jour ou de la nuit, aussi bien en surface que dans leurs galeries. Dans un autre type de cages d'élevage et dans les champs de culture, nous avons remarqué que le diamètre des galeries est peu supérieur à celui de l'insecte. Néanmoins, il existe par places des galeries d'un diamètre plus grand qui rend possible l'accouplement, dont la période s'étend de Mars à fin Juillet. Après cette époque on n'observe plus guère de pontes.

Malgré les soins apportés à cette étude, de nombreuses questions restent encore à élucider et nous espérons que sous peu de nouvelles observations viendront compléter nos modestes connaissances sur le problème gryllotalpien.

Séance du 19 Février 1936

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Neue *Pharoscymnus* Bed. aus Aegypten

(Coleoptera-Coccinellidae)

von L. Mader (Wien)

1. Pharoscymnus eichleri nov. spec.

Ganz schwarz, nur unterseits die Fühler, Mundteile, Beine, Epipleuren der Flügeldecken und die Ränder des Bauches, in einem Falle auch die Seiten der Hinterbrust und die Epimeren der Mittelbrust rötlichbraun. Oben verhältnismässig kurz, aber ziemlich dicht, niederliegend greis behaart, Bauch und Beine ebenfalls greis behaart. Umriss und Wölbung entsprechen dem bekannten *Ph. varius* Kirsch. Das spindelförmige Endglied der Kiefertaster sowie die übrigen Merkmale der Gattung verweisen die Art in die Gattung *Pharoscymnus.* — Länge 1.5-2 mm.

Patria: Aegypten: Mersa Halaib (leg: Dr. H. Priesner, 22.I.1933). Je ein Stück in coll. Min. Agric. Cairo und in coll. Mader.

Diese Art ist meinem lieben Mitarbeiter im Hauptberufe, Herrn Fachlehrer Eduard Eichler (Wien) gewidmet.

2. Pharoscymnus priesneri nov. spec.

Ein durch die eigenartige Färbung leicht kenntlicher *Pharoscymnus.* Fast kreisrund, ziemlich gewölbt, fein punktiert. Kopf und Halsschild schwarz, Seitenrand und Hinterecken des letzteren rötlich durchscheinend, Flügeldecken hellziegelrot, Naht-und Seitenrandkante sehr schmal schwarz oder schwarzbräunlich gesämmt. Mässig dicht, aber verhältnismässig lang, niederliegend behaart, die Haare auf Kopf und Halsschild greis, auf den Flügeldecken mit einem Stich ins Gelbliche. Epipleuren der Flügeldecken ziegelrot, die äussersten Kanten schwärzlich, Unterseite dunkel, der Bauch ziegelrot, gegen die Basis allmählich schwarz werdend. Die Beine ziegelrot. Tarsen gelblich. — Länge fast 2 mm.

Patria: Sinai (Wadi Ferran), 15.V.1934: 1 Stück in meiner Sammlung.

Die Art sei Ihrem Entdecker, meinem lieben Freunde Dr. H. Priesner

gewidmet. Sie steht, wie die folgende Tabelle zeigt, durch ihre Färbung in der Gattung ganz isoliert und daher ist sie mit keiner anderen Art zu verwechseln.

Unterscheidung der hier beschriebenen neuen Pharoscymnus-Arten von den übrigen.

1(4) Flügeldecken ziegelrot, höchstens Naht-und Seitenrandkante sehr schmal schwarz.

2(3) Kopf und Halsschild schwarz, letzterer höchstens am Seitenrande und in den Hinterecken rötlich durchscheinend. Naht- und Seitenrandkante der Flügeldecken schmal schwarz. — Aegypten .. **priesneri n.sp.**

3(2) Oben gänzlich ziegelrot. — Algier, Tunis .. **ovoideus ab. deserti Sic.**

4(1) Flügeldecken ganz schwarz oder mit hellen Makeln oder sonstiger Zeichnung.

5(12) Flügeldecken ganz schwarz.

6(7) Flügeldecken fast kahl, glatt. — Madagaskar ..... **atropos Sic.**

7(6) Flügeldecken deutlich pubeszent.

8(11) Grössere Arten (1.5-2 mm.) mit geneigter Behaarung.

9(10) Spärlich greis behaart, Schenkel mit Ausnahme der Knie schwarz. — Djibuti ..... **tristiculus Sic.**

10(9) Ziemlich dicht, kurz und niederliegend greis behaart. Auch die Schenkel ganz rot. — Aegypten ..... **eichleri n.sp.**

11(8) Sehr kleine Art (kaum 1 mm.), weniger tief schwarz und mit längerer, steif aufgerichteter Behaarung. Ansonsten dem *Stethorus punctillum* Wse. recht ähnlich. — Syrien ..... **berytensis Wse.**

12(5) Flügeldecken schwarz, mit freien oder verflossenen hellen Makeln oder sonstiger Zeichnung .... Hierher gehören alle sonst bisher beschriebenen Arten und ihre Variationen.

3. Pharoscymnus sexguttatus Gyllh.

Diese Art wird wohl vom Senegal und aus der Kapkolonie berichtet, scheint jedoch auch in Nord-Afrika sich einzubürgern. Schon Pic beschreibt (Echange 1926, 2) mit Vorbehalt zu dieser Art eine Aberration von Biskra. Ich nehme daher keinen Anstand, von Dr. Priesner in Aegypten gesammelte aberrante Stücke auf *sexguttatus* Gyllh. zu beziehen. Im übrigen wären dieselben von dieser Art schwer zu trennen.

Wenn man die drei hellen Makeln jeder Flügeldecke von vorne nach hinten mit 1,2 und 3 bezeichnet, liessen sich die Aberrationen folgendermassen übersehen :

a) Formula : 1,2,3 ..... **sexguttatus Gyllh.**

b) Formula : 1+2,3 ..... **ab. semijunctus Pic**

c) Formula : 1+3,2 (Aegypten : Wadi El-Tih, 22.XII.31, leg. Dr. Priesner) ..... **ab. externejunctus nov.**

d) Formula : 1+2+3+1, einen schwarzen Punkt einschliessend (Aegypten : Wadi Um-Assad, 9.IV.34, leg. Dr. Priesner) .... **ab. circumscriptus nov.**

Ein Stück dieser Art (Nominatform) besitze ich aus Cairo (ex coll. Winkler).

A preliminary review of the non-fossil species of the Genus *Melanthrips* Hal.

(Thysanoptera)

(with 2 Plates)

by H. Priesner.

In the light of R. S. Bagnall's recent discovery of some species of *Melanthrips*, most closely allied to *M. fuscus* (Sulz.) (viz., *M. harrisoni*, *M. bisetosus* and *M. thymicola*), I have re-examined all the material of this group which had accumulated during the last years, particularly captures from Cyprus, Palestine, and Egypt.

The *Melanthrips* forms of this group offer very few distinguishing characters to the eye, and, although convinced in some cases of the specific difference of the forms in question, I was unable at the beginning to separate them on the base of reliable characters; thus, years ago, I had described *M. pallidior* (n. sp.) as a variety of *fuscus*, and had confused with this form, pale specimens of the true *fuscus*.

Only recently, I succeeded in confirming the reliability of certain characters not used up to the present in this genus but known to be of great advantage in the differentiation of the species of other groups. At the same time I have re-studied and checked the value and practical applicability of some other characters, as the shape of the abdomen and its components, the bristles of the tergites, and the hind marginal fringe of the sternites as well as the chaetotaxy of the antennae. All the latter were largely used by A. Melis, in his exhaustive morphology of *Melanthrips* (Redia XX, 1933, pp. 143).

In 1927, when studying *Aeolothrips astutus* (Thys. Eur., 1928, p. 707), I considered for the first time the possible utility of the *sensory areas* in *Aeolothrips*, as a specific character — when applied with caution. Caution is advocated since one encounters not uncommonly monstrous specimens, and the study of a series of examples is considered necessary to obtain a decision on the specific constancy of the organ in question.

In *Melanthrips*, I have found the sensory organs of the 3rd and 4th antennal joint, in spite of certain variations, very reliable for the purpose of separating difficult species, as can be seen from the illustrations given in this

paper (1). In the number of accessory bristles on the sternites I found great variations in one and the same species but nevertheless, it is a character of some importance, and after it has proved extremely useful in more precisely separating difficult species of the genera *Thrips* L. and *Taeniothrips* Serv., I found it almost equally satisfactory in *Melanthrips*.

A third very helpful character lies in the number and arrangement of those postero-marginal prothoracic bristles which are situated within the postero-angulars (2) ; there are 4 - 5 (rarely 3) pairs of these bristles in certain species, whilst others have 6 - 7 pairs of them (Plate I, Figs 1 and 2) ; none of the monstrosities I have seen, in which a bristle may be duplicated or wanting, would have made me hesitate as to the assignment of them to the group where they belonged.

Thus, the particular characters indicated above, will be, I think, a further aid in the differentiation of the species within the genus *Melanthrips*, an addition to those features already known, as the colour of the wings and antennae, the preapical bristles on the hind tibiae, the measurements of the major bristles of the body, and the measurements of the antennal joints. All these characters can be seen from specimens mounted dorsally — the generally adopted rule in mounting Thysanoptera (3).

A glance at the resumé (p. 99) of Melis' monographic study of *Melanthrips* (l.c.) which contains a most interesting general morphology of the genus (in comparison with *Aeolothrips*), shows that this author was a victim of his method of preserving and mounting. He laid too much stress on the shape of the abdomen which in some forms presented itself to him as distended or bent downward or otherwise ; it is quite clear that such features are the result of the varying contractions of the abdominal muscles, resulting from the unequal action of the preserving fluid, accentuated by the varying amount of water contained in the body before the preservation. This point needs, I think, no further explanation, and Melis himself has already corrected the error in his conception of specific characters in a general way in his introduction to his monograph of *Liothrips oleae* (Redia XXI, 1934, p. 1) : « Infatti, specialmente per il primo genere (sci. *Melanthrips*), io ho basato, per il battesimo di qualche specie, i caratteri distintivi sulla conformazione dell'addome che, per molteplici ragione rilevate in seguito, ho constatato che

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(1) Attention must be paid however to the differing feature of this organ, appearing when observed in different directions, but the pale colour, permitting to trace this organ all round the joint, in transparent light, make it an easy character to examine.

(2) In all specimens, there is a single smaller posterior angular bristle below the large postero-angular; this bristle is not included in the 4 - 7 pairs mentioned above, and in the descriptions; cf. Pl. I, Figs. 1 - 2 sp.

(3) See : Hood (J.D.) : Microscopic whole-mounts of insects. — University of Rochester, 1934.

esso può andare soggetto a variazione e ad alterazioni non referibili a caratteri specifici e di consequenza qualcuna delle specie credute nuove dovrà essere revisionata ed eventualmente eliminata dall'elenco ».

Another point is the number and the position of the small bristles of the antennal joints, mentioned by Melis in his descriptions, showing the thoroughness with which he attended to the study of this problem. Not overlooking possible variations, the pubescence of the antennae should aid in the separation of the species were it not for the difficulty of getting the segments of one antenna in the same position in all the specimens; this point was not considered by Melis in his paper, as can be seen from the figures given which, though in most cases being a more or less lateral view, are naturally not viewed from identical angles (e.g. Fig. LI, p. 121 and Fig. LII, p. 123); besides, there is a lack of a special nomenclature of these antennal bristles which would be necessary if they are made use of for the comparison of species; otherwise, everything remains vague, and no one would know whether a certain bristle of the antenna of a certain species (or specimen) morphologically really corresponds with a similarly situated one in another species or specimen, and so on.

Melis' groups « *Plagiomelanthrips* » and « *Orthomelanthrips* » (l.c. p. 134) are taxonomically inadmissible and can therefore not be adopted, being based on the shape of the abdomen, i.e. on the state of preservation of the muscles or the distension of the intersegmental membranes.

I am fortunate enough to have been able to examine some of the types of Melis' *Melanthrips* species through the much appreciated courtesy of this author.

I have examined the following species:

Melanthrips falcatus, *lagenaeventris*, *minutus*, *elegans*, *inflativentris* and *acuminatus*.

The first one, *M. falcatus*, is identical with Bagnall's *M. bisetosus* (1934) but also with *M. fuscus* f. *gracilicornis* Maltbaek, which has priority. The others are identical, partly with the above species, partly with *fuscus* Sulz.

M. lagenaeventris and *M. inflativentris* are *gracilicornis* Maltb.

M. minutus, *elegans* and *acuminatus* are *fuscus* (Sulz.), Bagn.

The species: *M. contortus*, *cupreus*, *communis*, *siculus*, *aetnaeus*, I have not seen. *M. contortus*, *cupreus* and *communis* are very likely identical with *fuscus*; *M. siculus* may be an abnormal specimen of the same species; *M. aetnaeus* may be either *fuscus* or *gracilicornis* Maltb.

The material I have seen, did not contain the species *pallidior* Pr. which I suspected to be identical with one of Melis' species.

The valid species known to me are as follows:

Melanthrips fuscus (Sulzer), sensu Bagnall [4]
(Plate I, Fig. 1)

Sulzer, Abgekürzte Geschichte d. Insekten, 1776, p. 112.
Priesner, Thys. Eur., 1926, p. 92 (pro parte) (containing further references).
Melis, Redia XX, 1933.

Synonyma :

M. minutus Melis, Redia XX, p. 122, fig. LII.
M. elegans Melis, Redia XX, p. 124, figs. LIII-LV.
M. acuminatus Melis, Redia XX, p. 128, fig. LVI, 3.

Possible synonyma :

M. contortus, l.c. p. 102, figs. XLVI, XLVII.
M. cupreus, l.c. p. 109, fig. XLVIII.
M. communis, l.c. p. 112, fig. XLIX.

Female : A fairly large, nearly always dark species, the antennal joint 3 of which is always much lighter than 2 or 4, yellowish, sometimes more or less shaded with grey ; sensory area of joints 3 and 4 filiform but not circumpolar, only exteriorly close to the apex of the joint, interiorly however both ends of the thread-like area extending somewhat more basad (Plate II, fig. 1) ; joints 5 and 6 with about two irregular transversal rows of bristle-bearing pores ; joint 3 always somewhat convex interiorly ; head length from fore angles of eyes 140-145 μ ; cephalic bristles varying in length, interocellars 60 μ or more, post-ocellars sometimes reaching the hind margin of the vertex (48-54 μ) but usually shorter ; eyes length laterally 68-76 μ ; antennae length 380-415 μ ; joints, 36, 52, 68-72(28), 72(26), 46-50(22), 54-57(24), 36-40(20), 24-25(14-15), 32-34(12) μ. Pronotum length 136-152 μ, bristles long, anterior angulars 60-66 in large, about 50 μ in small specimens, interiors 48-50 μ (45 in small specimens), laterals 64-84, postero-angulars 80-100 μ ; at the hind margin there are 6-7 pairs [5] of smaller bristles and 1, rarely 2 pairs of premarginals, the interior of the latter on both sides of the middle and situated about in front of the innermost postero-marginals, the exterior (in some cases only on one side) situated between the 2nd and 3rd hind marginal bristle, counted from within. Hind tibiae, length 250-268 μ, with one (exceptionally 2 on one tibia) anteapical hair, besides, some stout spines, tarsal joint 1 with a pair of stout (24-32 μ, basal width 6 μ) spines. Wings much shaded but distinctly cleared up about the base ; upper vein of fore wnigs with 7-9 (rarely 6) bristles in the space between the distal cross-vein and the apex of the wing. Sternites of the abdomen with comparatively

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(4) Karny's specimen (Verh. zool.-bot. Ges. Wien, 1914, p. 51) from Gebel Bou-Kournin (Tunis) is *M. fuscus*; the specimen (Karny, l.c.) from Alexandria, I have not seen.

(5) The smaller bristle below the large postero-angular, present in all species, is not counted.

many accessory bristles, st. III with 2-4, IV with 2-3, V with 1-2, and VI with 1-2 pairs; hind margin of sternit VII normally, as in other species with 5 pairs of bristles, the two exterior pairs stouter; b. 1 of tergite 9, 104-124 μ, the longest (mid-lateral) bristle 128-145 μ.

Male: Sensory areas as in the female; also the postero-marginal bristles as in the other sex but in some cases 5+6 may appear instead of 6 pairs: accessory bristles of the sternites, III with 2-3, IV with 0-2, V with 0-1 pairs, VI without accessory bristles. Central distance of posterior pair of spines on tergite 9, 56-60 μ.

Habitat: Widely distributed over Europe, North Africa, Cyprus and Palestine (common); in Egypt, this species has been found only in the Mediterranean region (Matruh). — It occurs on various *Cruciferae*, but also on plants belonging to other families.

Melanthrips gracilicornis Maltbaek

(Plate II, Figs 1 and 2)

M. fuscus f. *gracilicornis* Maltbaek, Soc. Scient. Fenn., Commun. Biol., III. 16, p. 2 (sep.), 1931.
M. falcatus Melis, Redia XX, 1933, p. 79, figs. XXXV-XLV.
M. fuscus Priesner, Thys. Eur., p. 92 (pro parte), 1926.
M. bisetosus Bagnall, Ann. Mag. Nat. Hist. (10), XIV, 1934, p. 485 ([6])
M. lagenaeventris Melis, l.c. 1933, p. 119, fig. LI.
M. inflativentris Melis, l.c. 1933, p. 126, fig. LVI, 1, 2.

This form is apparently identical with *bisetosus* Bagn. described by Bagnall from France (on *Pisum*, *Vicia*, *Raphanus raphanistrum* and *Sinapis arvensis*), and is recorded by Bagnall from Morocco, Algeria and Libya, although these African specimens seem to me to belong to *libycus*, described below ([7]). Melis' *falcatus* can also only be referred to this species.

Owing to the difficulty of separating it from *fuscus*, I previously did not consider it as a particular species; it may be possible that the apparently intermediate forms one encounters, are hybrids or only seemingly so. In any case, in various captures from one plant (Austria, Palestine) both forms are associated, and Bagnall (l.c. p. 486) made the same observation. A biological experiment would easily solve this question.

M. gracilicornis is very similar to *fuscus* but of stouter build, having longer bristles — on an average —, two preapical hairs at the hind tibiae but is more reliably separated by the measurements of the antennal joints, which are longer.

([6]) Though it is possible that Sulzer's *Thrips fusca* is identical with this species and not with *fuscus* sensu Bagnall, it is rather unlikely and it will be the best to adhere to Bagnall's conception of the two species (l.c., p. 486).

([7]) I have examined specimens from Morocco (15.4.1914, coll. G. Buchet), ex coll. Bagnall, kindly loaned to me by Prof. Dr. J.D. Hood.

Following the description of the type specimen (lateral mount) : Colour as in *fuscus;* antennal joints 3-9: 76, 76(27), 60(22), 70-72, 46-49(20), 30-32, 40 μ; bristle-bearing pores on joint 6 irregularly in 2-3 cross-rows; sense-areas of joint 3-4, about as in *fuscus*, antero-angular bristles of the pronotum 86-88 μ, laterals 112, postero-angulars 114-116 μ; though the hind margin of the pronotum is not visible in the unique lateral mount, there are certainly at least 6 pairs of interior postero-marginal bristles present; hind tibiae 310-320 μ long, with *two* preapical bristles, the longest (distal) one measuring 92 μ, the other 60 μ [8]; spines near apex of tibiae stout (up to 50 μ), spines at base of tarsus (exteriorly) 34 μ; the apical portion of the upper vein of the fore wing bears 8-9 bristles; the sternites set with accessory bristles on III-VI, in the type specimen 2-3 pairs on III, 2 pairs on IV, 1 pair on V, and 2 pairs on VI (in *lagenaeventris* Melis, identical with this species, there are ? on III, 2-3 pairs on IV, 1 pair on V, and 2-3 pairs on VI). B. 1 on segment 9, 124-128 μ, b. 3 ab. 156 μ (in other specimens 140-150 μ). Bristles at hind margin of sternite VII as in *fuscus*. Ovipositor about 360 μ, as in *fuscus*. In the female, the antero-angular bristles of the pronotum are longer than in *fuscus*, even the interior ab. 64 μ; in many specimens however, the measurements are much smaller than in the type specimen described above.

Male: Bagnall gives the following measurements of the antennal joints 3-9: 62(25), 62(21), 47(17.5), 65(21.5), 31.5(17), 21.5(14), 27(10) μ. — Having no male at hand that could be assigned to this species with absolute certainty, I am unable at present to give a fuller description.

Habitat: Germany, Poland, Austria, Hungary, France, Spain, Italy, Sicily, Palestine; Morocco, Algeria, Libya. — Certainly more widely distributed.

In Egypt, there exists a form, presumably belonging to *M. gracilicornis* as a variety, having the antennae still more slender, to which may be provisionally given a specific name until the phylogenetic relation between *gracilicornis* and *fuscus* is ascertained; if they are really different, as Bagnall believes, then the following form, *M. libycus*, is a third species of this group, and not a race.

Melanthrips libycus spec. nov.
(Plate II, Fig. 3)

Colour as in *gracilicornis* but all the many specimens at hand are lighter, brownish, possibly owing to the action of the preserving fluid. As in *gracilicornis* the hind tibiae are provided with *two* preapical hairs of which the

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[8] These hairs vary considerably in length; in some specimens, the distal one is shorter than the proximal, in others, only one can be seen.

distal one is somewhat longer in most cases. The antennae are longer and more slender than in either *fuscus* or *gracilicornis*.

Head length from fore angles of eyes, ab. 168 μ; eyes length laterally 80-85 μ; interocellar bristles ab. 80, postocellars 64-68 μ, as a rule, attaining or surpassing the hind margin of the vertex; antennae length 475-520 μ; measurements of joints: 32(36), 52-56(31), 80-84(27-28), 80-82(25), 60(20-21), 72-74(21-22), 47-48(19-20), 28-32(13-14), 36-40(11) μ; joint 6 above with two very scattered cross-rows of bristle-bearing pores, sense-areas on joints 3 and 4 about as in *fuscus;* pronotum length 168-172 μ; antero-angulars 68-84 μ, interior antero-marginals 56-68, laterals 84-104, postero-angulars 96-105 μ; hind margin with 6-7 pairs of bristles within the postero-angulars, and mostly two pairs of premarginals, when one of the postero-marginals (b. 3) may be situated somewhat higher than the others; fore wings comparatively broadly pale at base, in the distal part of their upper vein with 8-11 bristles; in this species there are also comparatively many accessory bristles on the sternites, viz., 3-5 pairs on III, 2-4 pairs on IV, 2-3 pairs on V, and 2 pairs on VI. Hind margin of sternite VII with 5 but abnormally also with 6-7 pairs of bristles. Hind tibia, length 303-320 μ, with two preapical bristles, 58-64, and 80-88 μ, respectively; apex of tibiae densely set with stout yellowish spines (longest 48 μ); basal exterior spines on 1st joint of hind tarsi about 30 μ. B. 1 on segment 9 of the abdomen 120-125, b. 2 128-132, b. 3 148-160 μ. Ovipositor 346-363 μ.

Male: The principal characters as in the female. The bristle-bearing pores on apical portion of joint 6 of the antennae attain about the middle of the joint. Postocellar bristles ab. 52 μ, interior antero-angulars of pronotum 56, laterals 72, postero-angulars 80 μ; also the male is usually provided with two pairs of premarginal bristles on hind margin of pronotum. The number of accessory bristles seems to be about the same as in *fuscus;* length of preapical bristles of hind tibiae 40 and 53 μ; measurements of the antennal joints 3-9: 68, 68, 52, 78, 36, 24-26, 30-32 μ.

Habitat: Upper Egypt, Kom Ombo, 5.3.31, numerous specimens swept from wheat and from *Cruciferae* (in Citrus orchard), coll. H. Priesner. — The specimens mentioned above (p. 33 (7)) from Morocco, belong to this form.

Melanthrips sudanensis spec. nov.

(Plate II, Fig. 4)

This species, as large as *fuscus*, is very close to this and to *gracilicornis*, but characterized by the short bristles of the pronotum.

Female: Wings as in *bisetosus*, shaded but broadly hyaline at base, and the shading in the middle of the wing somewhat darker than towards apex. Fore tibiae rather light, shaded only at margins, joint 3 of the antennae

yellowish, more or less slightly shaded with grey. Sensory area on joints 3 and 4 of the antennae as in the former, filiform and not circumpolar, but finer, still more thread-like, and not terminating in a knob; antennae very slender; bristle-bearing pores on joint 6 with larger intervals, and therefore attaining about the middle of the joint. Inter-ocellar bristles 60-65, post-ocellars however much shorter 48 μ; antero-marginal bristles of the pronotum comparatively very short, the inner and the angulars 40-45 μ, the lateral bristles 52, the postero-angulars 75-80 μ; there are 5-7 pairs of postero-marginals, shorter and tenderer than in *fuscus;* only the inner pair of premarginals present, the outer wanting, more closely approaching the hind margin than in the former species. Hind tibiae with a long preapical hair (up to 85 μ), the 2nd, more basally situated hair, though present, nearly as short as in *fuscus*, 34-36 μ; tibiae spiny at apex, tarsal spines well developed; length of hind tibiae 277 μ. Upper vein of fore wing with 5-6 bristles in its terminal portion. Accessory bristles of the sternites less numerous than in the former, III with 2-3,IV with 1-2, the following sternites without accessory bristles. Bristle 2 and 3 of sternite VII very small. Antennae length 450-467 μ; measurements of joints: 28(36), 50(28), 78-80(24), 72(24), 52(20), 68(21), 46(17), 28(12), 32-34(9-10) μ. Bristle 1 on segment 9, 112, the long mid-laterals 120-132 μ.

Male: Bristle-bearing pores on joint 6 reaching down beyond middle, the sense-areas of joints 3 and 4 as in the female; inter-ocellar bristles 44 μ at the most, post-ocellars about 40; interior fore marginals of pronotum 32-37, angulars as well, laterals 36-38, posterior angulars 65 μ; hind marginals as in the female; accessory bristles of the sternites, III with 2, IV with 0-1, the following sternites without accessory bristles. Antennae length 380-390 μ: joints, 28(31), 44(25), 64(22), 64(21), 42(18), 68(21), 32(15), 20(11), 28(8) μ.

Habitat: Egypt (Sudan Frontier), Gebel Elba, Wadi Aideb and Wadi Kansisrob, 30.I.1933-4.2.1933, on *Panicum turgidum* and swept from various other plants (H. Priesner).

Melanthrips pallidior Pr.

(Plate I, Fig. 2 and Plate II, Figs 9-10)

Priesner, *M. fuscus* var. *pallidior*, Sitzgsb. Akad. Wiss. Wien, 128, 1919, p. 119.
Priesner, *M. fuscus* ab. *pallidior*, Museelber. Linz, 78, 1920, p. 51.
Priesner, *M. fuscus* var. *pallidior*, Thys. Eur., 1926, p. 94.
(not *pallidior* Knechtel, Thys. din Romania, 1923, p. 60).

Female: A smaller species (length, much distended 1.6 mm., hind tibiae 234-250 μ); wings somewhat paler at base but sometimes only the extreme base of costa lighter; antennal joint 3 usually lighter than 4 but in all cases much shaded, certainly much darker than in *fuscus;* fore tibia rather dark; sensory areas of joints 3 and 4 peculiar, always exactly circum-

polar, and short, sometimes occupying not even half the circumference of the joints, the ends of the almost filiform « areas » not bent downward (Plate II, Figs 9 and 10) ; joint 3 slender ; bristle-bearing pores of joint 5 and 6 not densely set, forming about two cross-rows on 6 ; interocelar bristles ab. 60 μ, postocellars 48 ; inner antero-marginal prothoracic bristles 44-56 μ, exterior pair longer, 60-72 μ, laterals 76-88 μ, posterior angulars of the same length ; hind margin within postero-angular bristles with 4 pairs of smaller bristles and only 1 pair (the inner) of premarginals ; hind tibiae pre-apically with well developed hair, 76 μ in the type specimen, but often much shorter, 68-72 μ (in the specimens from Cyprus 52-66 μ) ; *spines at apex of tibia weak*, bristle-like, as well as the spines attached to tarsal joint 1 ; upper vein of fore wing in its apical portion with 7-8 bristles. Sternites of the abdomen bearing few accessory bristles, on III 2-3 pairs, on IV 1-2 pairs, the following sternites without accessory bristles ; the blackish fore marginal thickenings of the sternites laterally not extending so far as in *fuscus ;* bristle 1 on tergite 9, 100, the longest, mid-lateral 128-136 μ. Antennae length 380-407 μ ; measurements of joints of holotype (from joint 2) : 48, 56-59, 56-58, 50-52, 52-54, 42-44, 24-26, 32 μ ; of Palestine specimens, 28(28), 48(27), 60-64(20), 58-60(21), 48-52(19), 54-56(21), 40-42(19), 24-26(13), 32(10) μ.

Male (specimens from Palestine) : Sensory areas as in the female ; bristle-bearing pores on joint 6 arranged in at least 3 cross-rows, more densely set than in *M. separandus ;* 4 pairs of prothoracic posteromarginals ; sternites with accessory bristles, III with 1-2, IV with 1, V with 0-1 pairs, the following without bristles ; pronotum, inner antero-marginals 32-34, antero-angulars 44, laterals 60-65, postero-angulars 58-60 μ ; antennal joints 3-9 : 50-52, 42-44, 38-40, 52, 36, 19, 24 μ.

Habitat : Austria, Albania, Cyprus, Palestine. — The type female is described from Albania (Elbasan, 20.4.1918) ; a few Austrian specimens (found in April and May) from Grünburg, Micheldorf and Klaus (on leaves of *Petasites*) in Upper Austria, and from Graz in Styria ; in Cyprus, this species was taken by Mr. Mavromoustakis at Limassol (5.3.33) in flowers of *Papaver ;* the Palestinian samples were collected by Dr. Bodenheimer from flowers of *Thrincia tuberosa* (30.3.1931) at Kirjat Anawim.

It is a common species, and certainly widely distributed.

Melanthrips thymicola Bagnall.

Bagnall, Ann. Mag. Nat. Hist. (10), XIV, 1934, p. 486.

This species seems to come very close to *pallidior* but only a comparative study of the types can reveal their difference or identity ; *thymicola* is characterized by having unicolourous antennae and wings but does not differ very

much from *pallidior* in the measurements of the appendages and bristles. Antennal joints 3-9: 56(24), 50(23), 44(22.5), 50(23), 36(21), 23.5(14.5), 28(12) μ (after Bagnall); longest bristle on segment 9 of abdomen 135 μ, interocellars 65 μ, laterals and postero-angulars 80-82 μ.

Melanthrips separandus spec. nov.
(Plate II, Figs 5 and 6)

From *fuscus*, differing in the chaetotaxy of the pronotum and the sternites, from other species by the shape of the sensory areas of the antennal segments 3 and 4.

Female: Somewhat smaller than *fuscus* (pronotum length 120-132, pterothorax width ab. 270 μ), and therefore similar to *pallidior;* fore tibiae dark, or somewhat paler within, joint 3 of the antennae dark or but slightly lighter than the joints 2 or 4; wings pale at base; sense area on joint 3 and 4 similar as in *fuscus*, as to its situation, i.e., not parallel but diverging from apical margin of joint, obliquely directed inward, and therefore fundamentally different from *pallidior;* but these filiform sensory areas are shorter than in *fuscus;* whilst in *fuscus*, they surround the joints for three quarters of the circumference, they occupy in this species, two thirds to one half of the joints; the bristle-bearing pores on joint 6 are arranged in two rows; cephalic bristles, interocellars 64-68, postocellars 40-44 μ. Interior antero-marginal prothoracic bristles about 45, antero-angulars 60-72, laterals 80-92, postero-angulars 68-80 μ; there are 4-5 pairs of posteromarginals within, and 1 pair (inner) premarginals which are situated more closely to each other than the innermost posteromarginals to each other. Hind tibiae, length 233-260 μ, with a long preapical bristle, 50-60 μ, the 2nd, anterior pair, though developed, very small (24 μ), easily to be overlooked; spines weak, bristle-like. Apical portion of upper vein of fore wings with 5-6 (seldom 7) bristles. Sternites with much less accessory bristles than in *fuscus*, sternites V-VI always without, III with 1-2 pairs, IV with 0-1 pair; antennae similar to those of *pallidior*, length 363-400 μ; measurements of joints (varying in length as in *pallidior*): 32(27), 48(27), 60-64(20), 52-60(20), 42-48(16), 52-56(20), 36-38(18), 20-22(13), 30-32(11) μ. Bristles 1 on segment 9, 96-108, the longest, mid-lateral, 120-132 μ.

Male: Having rather larger antennal joint 6, being longer and broader (59 : 22) than in *pallidior* (48-52 : 20), with 4 not dense cross-rows of bristle-bearing pores, about as in *pallidior*, joint 5 about 40 μ in both species; the divergence of the sense-area of joint 4 with the fore margin is less marked in the male than it is in the female. Sternites with 1 pair of accessory bristles on III only. Measurements of antennal joints: 3-9: 53-56(21), 50(19), 39(20), 59(22), 27(17), 20(11), 25(11) μ.

Habitat: Palestine, Kirjat Anawim, 10.2.1935, Dr. F. S. Bodenheimer coll. (N 7).

Melanthrips arabs spec. nov.
(Plate II, Fig. 7)

Female: Agreeing with *separandus* in many characters but differing by the much more slender terminal antennal joints, and the sensory areas which are more strongly arched, and are extending farther towards the middle of the joints; these areas are not dilated at their tips. Colour as in the allied species, fore tibiae dark, sometimes somewhat paler within, wings not very broad (145-160 μ), somewhat hyaline at base; *antennae wholly dark;* joint 6 with 2-3 scattered cross-rows of bristle-bearing pores. Cephalic bristles, interocellars 64-68, postocellars 48-50 μ. Prothorax 136-144 μ, interior antero-marginal bristles 36-42, antero-angulars 56-66, laterals 88-109, postero-angulars 98-105 μ; there are 5 pairs of postero-marginals within, and 1 pair only of premarginals, somewhat remote from hind margin (16-24 μ), and somewhat closer to each other than the innermost posteromarginals. Hind tibiae, length 268-277 μ, with 1 long (76-92 μ) preapical hair; spines at apex of tibia and on first tarsal joint weak, more bristle-like. Terminal portion of upper vein of fore wing with 6-7 bristles. Sternites with 2 pairs (or 5 altogether) of accessory bristles on III, and none or 1 on IV, none on the following. Blackish fore margins of sternites not extending so far laterally as in *fuscus*. Antennae length 389-424 μ; measurements of joints: 28(29), 48-49(28), 60-64(20), 62-64(21-22), 45-48(19-20), 49-54(20), 36-38(17), 27-28(11-13), 31-34(11) μ. Bristles on segment 9 of the abdomen, b.1 104-112, the longest, b. 3 (mid-lateral) 136-148 μ.

Male: Very similar to that of *separandus* but joint 4 and the terminal joints much longer; joint 6 with 4-5 rather regular rows of bristle-bearing pores; sense areas on 3 and 4 almost as in the female; sternites without accessory bristles except on III which has 1-2 pairs of very small bristles (II has in all cases 1 pair of very distinct, and 1 pair of vestigial bristles, the latter close to the fore margin); postocellars about 40, interocellars 52-56 μ. Prothoracic bristles, inner antero-marginals 36, antero-angulars about 45, laterals 72, posteroangulars 74-80 μ; posteromarginals within, as in the female. Antennae, 20-24(28), 44(27), 60(19-20), 62-64(20-21), 44(18), 56(20-21), 32(17), 23(11), 30(10) μ. — In some specimens, the wings are almost wholly dark.

Habitat: Egypt, Helouan, Wadi Geraui, 13.2.1935 (W. Wittmer coll.), and Wadi 'Of, 18.1.35 (A. Rabinovitch coll.), 1 female and several males; about 30 specimens, 19.1.36, Bir Meyer and Wadi Geraui, in flowers of *Stachys aegyptiaca* Pers. (H. Priesner coll.).

Melanthrips tristis spec. nov.

Female: Wholly dark, fore tibiae not paler within, antennal joint 3 though somewhat paler than 4, much shaded throughout. Wings uniformly dark. Antennae slender, total length 380-400 μ; joints, 32(28), 48(27), 59-60(21), 56(20), 44-46(20), 54(20), 39(17), 24(12), 32-34(10-11) μ; the slender joints 3 and 4, and the elongate terminal joints distinguish this form from *thymicola* Bgn. and *acetosellae* John which however are in general very similar; sensory areas about as in *separandus*, around the apical margin and but slightly bent downward on joint 3, more distinctly arched, below within, on joint 4, the tips not distinctly enlarged; joint 6 above with 2 rows of bristle-bearing pores. Eyes length 72-76 μ, interocellar bristles 64, post-ocellars 40-45 μ. Pronotum length 132 μ; bristles, inner antero-marginals 45, antero-angulars 56-68, laterals 88-96, postero-angulars 84-92 μ; hind margin within with 3-4 pairs of bristles, and 1 interior premarginal pair, well (12 μ) distant from hind margin, and closer to each other than the inner-most hind marginals. Spines on hind tibiae (tibiae length 250-260 μ) bristle-like, the longest 48 μ, preapical bristle moderately long, 56 μ. Terminal part of upper vein of fore wings with 6-7 bristles. Sternites with 1 pair of accessory bristles on III, and 1 pair on IV only. B.1 on segment 9, 108 μ, the longest, mid-lateral, 136 μ.

M. tristis is also very similar to *pallidior* but the position and length of the sensory area on joint 4 easily distinguishes it; moreover, the accessory bristles of the sternites are much less numerous. Morphologically, it comes very close to *separandus* but the prothoracic bristles are longer, the inner posteromarginals less numerous, and the wings wholly dark.

Habitat: 1 female, Palestine, Kfar Naum, 8.3.1935, in flower of *Chrysanthemum*, coll. Dr. E. Rivnay.

Melanthrips knechteli spec. nov.

(Plate II, Fig. 8)

Knechtel, *M. fuscus* var. *pallidior*, Thys. din Romania, 1923, p. 60.

In this species, the wings are but slightly paler at base, so that it may also be dealt with in the group having uniformly dark wings. The specimens at hand are of pale colouration, i.e. immature, and have been confused, therefore, with similarly coloured specimens of *pallidior*.

Female: Antennal joint 3 is somewhat lighter than 4 but it might be wholly dark in fully mature examples. Distinctly smaller than *fuscus*, this species much resembles *pallidor* and its allies; fore tibiae yellowish apically, besides, a narrow pale strip within; wings slightly shaded with grey. Body with hypodermal orange pigmentation. The sensory areas on joints 3 and 4 are somewhat similar to those of *fuscus*, i.e., not parallel to the apical margin

of the joints, *but broader*, particularly at the tips, than in any one of the allied species, and the tips themselves are much enlarged thus the « areas » are dumb-bell-shaped; joints 5 and 6, apically, rather unevenly set with bristles, and therefore their pores placed irregularly. Interocellar bristles 44-48, postocellars 40-44 μ. Prothorax length 120-125 μ, inner antero-marginal bristles 40, antero-angulars 48, laterals and posteromarginals 68-80 μ; hind margin with 4-5 pairs of smaller bristles within, 1 pair of premarginals, situated as in *pallidior*. Hind tibiae, length 242-260 μ, with a very fine preapical hair, about 60 μ, spines of tibia and tarsus bristle-like, as in *pallidior*, spine of basal tarsal joint thin, 1.6-2 μ wide, at base. Upper vein of fore wing with 5-7 bristles in its apical portion. Sternites very sparingly set with accessory bristles, only sternite III with 1 pair, the remaining without bristles. Antennae length 398-424 μ; joints, 2-9; 48-50(29), 68-70(27), 64(24), 46-48(21), 52(22), 40(21), 24(14), 32(11) μ. Bristle 1 on segment 9, 92-96 μ, the longest, mid-laterals, 116-125 μ.

Habitat: Rumania, Comana (Vlasca), April, in flowers of *Cerinthe minor*, W. Knechtel coll.

Melanthrips areolatus spec. nov.
(Plate II, Figs 13 and 14)

Female: A smaller species, about as *pallidior* and *knechteli*, fore tibiae yellowish, except their margins, but sometimes much darker; joint 3 of the antennae rather light, much lighter than the adjoining joints; wings pale at base. Sense-areas on joints 3 and 4 very peculiar: they are not filiform as usual but broad and nearly roundish having the shape of an areola, on joint 4, occupying almost the whole width of the joint and being narrower on joint 3 (Plate II, Fig. 14); areas on joint 4, 11-13 μ long and 14-15 μ broad; bristle-bearing pores on joint 6 in two rows. Bristles on body long. Cephalic bristles, interocellars 64-72, postocellars 60-65 μ; prothoracic bristles, inner antero-marginals 45, antero-angulars 55-60, laterals 68-72, postero-angulars 80-85 μ; prothorax length 140-145 μ; posterior margin of prothorax with 6 pairs of bristles within, as in *fuscus*, besides, *with 2 pairs of premarginals*, the inner of which is situated, as usual, in front of the innermost pair of hind marginals, though closer to each other than the innermost postero-marginals; the exterior premarginal pair being about in front of the 3rd posteromarginal, counted from the middle. The usually long preapical bristle on the hind tibiae is weak, scarcely surpassing the surrounding bristles, tarsal joint 1 with 2 spines, 28 μ; length of hind tibiae 260-277 μ. Upper vein of fore wing with 5-6 bristles at distal part; cross veins sometimes vestigial and also longitudinal veins less conspicuous than usual. Accessory bristles well developed, sternite III with 2-3, IV with 1-2, V with 1-2 and also VI

with 1-2 pairs of accessory bristles; sternite VII with 6 pairs of bristles at hind margin, b. 2 and 3 very small. Measurements of antennal joints: 32(31-32), 48(28), 62(22), 62-64(20), 48(19), 52(20), 42(18), 28(13), 36(10) μ. Bristle 1 on segment 9, 120-128, the longest, mid-lateral, 132-140 μ.

Male: Sense areas as in the female; joint 6 with 4-5 irregular rows of bristle-bearing pores; postocellar bristles 48-52 μ; prothoracics: inner antero-marginals 40-44, antero-angulars 48-52, laterals 65, postero-angulars 68 μ; two pairs of premarginal prothoracic bristles as in the female; accessory bristles of sternites well developed, 3 pairs on III, 1-2 on IV, 1 on V, and 1-2 pairs on VI. Apical part of upper vein of fore wings with 5-7 bristles. Measurements of antennal joints, 32(32), 44(27), 60(21-22), 60(19-20), 26(17), 60(20-21), 36(17), 24(11), 32(8) μ.

Habitat: Egypt: Alexandria, Nouzha Garden, 2.3.1929, on *Chenopodium;* Mex, 15.3.1929, on *Suaeda vera;* Hamnam, Mariout, 16.3.1930, on barley (*Hordeum*).

Melanthrips acetosellae John
(Plate II, Fig. 11)

John, Bull. Ann. Soc. Ent. Belg., LXVII, 1927, p. 304.

Female: This species is characterized by the unicolorously shaded wings, the uniformly dark antennae, the short prothoracic bristles, and the atrophy of the preapical hair on the hind tibiae; fore tibiae almost dark. Sensory areas on joints 3 and 4 similarly situated as in *fuscus;* the pale bristle-bearing pores on joint 6 scattered, in two rows. Postocular bristles 45, inner antero-marginals and antero-angulars of pronotum 35-40 μ, laterals only 40-44 μ, posteromarginals about 75-80 μ; 4-5 pairs of smaller postero-marginals within, and but the inner pair of the premarginals developed; pronotum length 135-140 μ. Hind tibiae, length 215-235 μ, with preapical hair much reduced, 28 μ; spines at apex of hind tibiae rather weak. Distal portion of upper vein of fore wing with 6-8 bristles. Accessory bristles of the sternites moderately developed, 1-2 pairs on III, 1 pair on IV (only a few specimens examined). Measurements of antennal joints 3-9: 60-62(24), 52-58(24), 38(22), 44-48(22), 34-36(18), 20-22(13), 28-30(11) μ. Bristle 1 of segment 9, 92-100, the longest, mid-lateral, 105-116 μ.

Habitat: France, Lièrges, 21.5.1927, on *Rumex acetosella*, O. John coll.

Melanthrips harrisoni Bagnall

Bagnall, Ent. M. Mag., LXVI, 1930, p. 48.

According to Bagnall, this species comes near to *acetosellae;* it is described after a single teneral specimen, has the wings pale yellowish brown,

fore tibiae and tarsi yellowish, *3rd antennal pale yellow*, shaded brown in distal margin. Antero-angular, lateral, and postero-angular prothoracic bristles 50, 68, and ca. 90 μ long respectively. The inner margin of joint 3 is slightly convex, the outer straight, as in *acetosellae;* measurements, of joints 3-9: 65(28), 64(25.5), 47.5(24), 46(24), 28(21), 21(15), 27(12.5) μ. Hind tibiae length 238 μ (width 48 μ). No preapical hair on hind tibiae. Longest bristle on segment 9 (mid-lateral) 150 μ.

Habitat: England, Kent (in June).

Melanthrips bagnalli spec. nov.

Female: Near *acetosellae* John and *harrisoni* Bagn.; colour dark, but the unique specimen not fully mature; *antennae, wings and fore tibiae wholly dark;* fore tarsi scarcely lighter than the others. Sense areas on joint 3 not parallel to apical margin but obliquely bending downward, and attaining about the distal third of the joint, on joint 4 similar, but the lower part of the filiform sensory area runs straight towards the middle of the joint, attaining it or at least its second fifth; the tips of the « areas » are sometimes slightly thickened. Antennae length 415-425 μ; measurements of joints, 32(32-34), 48(31), 60(28), 66-68(25), 42-44(21), 50-52(21), 34(18), 28-29(14), 40-41(11) μ; antennae slender but joint 3 thicker and shorter than in the allied species, somewhat rounded laterally, certainly not so conical as in *acetosellae*, distinctly shorter than 4, ultimate joint longer than in *acetosellae* and much longer than in *harrisoni;* joint 6 with two cross-rows of bristle-bearing pores, apically; eyes length 88 μ, laterally; cephalic bristles, interocellars 68-72, postocellars 64 μ. Pronotum length 148 μ; antero-marginal bristles: interiors 28, angulars 32 μ; laterals 52-56, postero-angulars 68-70 μ; hind margin with 5 pairs of smaller bristles within, and the interior premarginal pair very close to the hind margin (only 6 μ distant), thus appearing to belong to the marginal series proper. Hind tibiae, length 240-250 μ, without preapical hair; apical spines short. Wings pale grey throughout, not paler at base; 5-7 bristles on outer part of upper vein of fore wings. Sternites with 2 pairs of accessory bristles on III, and 1 pair on IV. Bristle 1 of segment 9, 112 μ, the longest, mid-lateral, measuring 136-140 μ.

Habitat: 1 female, Egypt, Amriah (Mariut), 28.4.1932, swept from herbs (H. Priesner coll.).

Melanthrips nigricornis Bagnall

(Plate II, Fig. 17)

Bagnall, Ent. M. Mag., XXIV, 1913, p. 263.
(Not *nigricornis* Priesner, Stett. Ent. Zeitg., 94, 1933, p. 197).
Melis, Redia XX, 1933, p. 131.

I have four original specimens before me (Djebel Achkel, N. E. Tuni-

sia, 27.3.13, on *Convolvulus tricolor* ?, P. A. Buxton; ex coll. Karny & Hood (9), don. Bagnall).

A larger species, similar in size to *fuscus* and *gracilicornis*, but antennae and wings wholly black, and hind tibiae without long preapical bristles. From the following species it considerably differs by the shape of the sensory areas.

Female: Fore tibiae lighter along middle, outer and inner margin dark; sense areas on joint 3 and 4 of the antennae finer than in *fuscus*, running farther down towards base than in *fuscus*, on 4 attaining the distal 4th or 3rd of the joint, the tips of the fine lines are hardly widened; *joint 3 somewhat concave at outer margin, beyond base*, 4 from base to middle more slender than in either *fuscus* or *matthiolae*; joint 6 with 2-3 irregular rows of bristle-bearing pores. Body bristles long. Cephalic bristles: interocellars about 68-80, postocellars 54-64 μ. Pronotum length 156-184 μ, bristles, inner antero-marginals 62-68, antero-angulars 68-84, laterals 100-112, postero-angulars 108-120 μ: postero-marginals within, comparatively long, dark, 6-7 pairs, and 1-2 pairs of premarginals; the second, outer pair, joins the marginal series in 1 specimen, as in *fuscus* while in the other it is somewhat more distant (8-10 μ). Hind tibiae, length 277-310 μ, *without long preapical setae*, spines stout, those of tarsal 1 34-40 μ in length. Apical portion of upper vein of fore wing with 7-9 bristles. Sternites with accessory bristles on III-VI, i.e., 2-3 pairs on III, 1-3 pairs on IV, 1-2 pairs on V, and 1-2 pairs on VI; in *matthiolae*, they are wanting on segments V and VI. Measurements of antennal joints: 40(34-35), 54-56(31), 80-82(25), 76-82(25), 52-58(21-22), 64-70(22-25), 38-44(20), 32-37(16), 38-42 (11-12) μ. Bristle 1 on segment 9 long, 160-165 μ, the longest, mid-lateral, 188-200 μ.

Male: Shape of the antennae as in the female, and therefore easily separated from the male of other species; sense-areas somewhat broader than in the female; joint 6 with three irregular rows of bristle-bearing pores. Postocellar bristles ab. 50 μ; pronotals, interior antero-marginals ab. 52, laterals ab. 80, postero-angulars 72-76 μ; hind marginals as in the female; bristles on tergite 9, central distance of posterior dorsal pair of spine-like bristles 65-68 μ; the bristleless pores on disk of tergite 9 are situated in front (on a higher plane) of the two pairs of dorsal spines, and not at the sides of pair 1 as in *matthiolae*; sternites with accessory bristles on III: 1-2 pairs but none on the following sternites (in the unique preparation). Antennae length 433-440 μ; joints 3-9: 70(24), 70(24), 49(20), 63-64(24), 34(18), 28(15), 34(11) μ.

Habitat: Tunisia; ? Sicily.

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(9) The author is much indebted to his friends, Prof. Dr. J.D. Hood and Prof. Dr. H. H. Karny, for the loan of this and many other species of their valuable collections.

Melanthrips matthiolae spec. nov.

(Plate II, Fig. 16)

Priesner, *M. nigricornis*, Stett. Ent. Zeitg., 94, p. 179.

Differing from *nigricornis* Bagn. by the much shorter bristles of the body and the wings, and the entirely different sensory organs of the antennals 3 and 4, furthermore by the absence of accessory bristles on the sternites V and VI. Agreeing with *nigricornis* in the lack of preapical hairs on the hind tibiae, and in the colour of the antennae and wings which are wholly dark.

Female: Of the size and colour of *nigricornis*, but fore tibiae darker not or but slightly paler within. Antennal joint 3 not concave beyond base, 4 stouter than in *nigricornis;* the sensory «areas» are characteristic by their length and irregular current; they are parallel with the apical margin only for a short distance, bend on the upper side similarly basad as in *fuscus*, but on joint 4 they sometimes take a rectangular turn; on the lower surface of the joint they form a right angle already at the apical margin, and run to the middle or nearly so, in a sinuous line, ending in an irregularly shaped, sometimes boot-like thickening. Bristle-bearing pores on joint 6 in 2-3 rather scattered rows. Cephalic bristles, interocellars 44-48, postoculars 45 μ. Pronotum length 176-185 μ; prothoracic bristles: inner antero-marginals 40-42, antero-angulars 45, laterals 60-65, postero-angulars 76-85 μ; there are 6-7 pairs of posteromarginals within, one of which is sometimes situated premarginally but very close to the margin, the interior preapical pair not more than 12 μ distant from hind margin. No long hairs on hind tibiae (length 268-295 μ), spines stout, basal spines of hind tarsi 25 μ. Upper vein of fore wings with 7-9 bristles in its outer part, which are much shorter (40-45 μ) than in *nigricornis* (60-80 μ). Sternites with accessory bristles only on segments III, 1-3 pairs, and IV, 0-1 pair. Antennae length 433-467 μ; measurements of joints 34(32), 50(31), 68-70(28), 72-74(25-27), 44-48(21), 50-55(21), 36-40(18), 30(14), 44-46(11) μ. Bristle 1 on segment 9, 116-128, the longest, mid-lateral, 136-160 μ. Segment 10 not split dorsally up to the insertion of the britles 1 (as in *nigricornis* and *fuscus*) but only slightly incised at apical margin.

Male: Sense areas as in the female, S- or Z-like bent particularly on joint 4; joint 6 moderately long in comparison with other species, with three scattered rows of bristle-bearing pores. Postocellar bristles about 40 μ; pronotals: inner antero-marginals 32-36, as the antero-angulars, laterals 40-45, postero-angulars 64-68 μ; hind marginals as in the female, an outer premarginal sometimes separated from the marginals. Bristles on tergite 9 stout, central distance of posterior pair 50-55 μ; Sternites with accessory bristles on III, 1-2 pairs, and IV, 0-1 pair. Antennae length about 405 μ; measurements of joints: 28(34), 48(31), 66-68(24), 64-68 (22), 42(20), 56(21), 34-36(17), 27(13), 40(10) μ.

Habitat: Types (♀ and ♂), Egypt, Wadi Morrah, 21.2.1930, in flowers of *Matthiola livida*. Identical with these are the specimens listed by me as *M. nigricornis*, from Canary Islands, Lanzarote, Tias, 9.5.1931, on *Matthiola* sp. (Larvae described l.c. p. 179).

Melanthrips ficalbii Buffa
(Plate II, Figs. 18 and 19)

Buffa, Soc. Tosc. Sci. Nat. Proc. Verb., Pisa, 1907.
Priesner, Thys. Eur., p. 91, 1926 (here further references).

Synonyma:

M. angusticeps Bagnall (Plate II, Fig. 12), Ent. M. Mag. (3), X, 1924, pp. 2-3; 1926, p. 280.
M. angusticeps Priesner, Thys. Eur., 1926, p. 92.

Female: Brown to blackish brown, fore tibiae pale yellow, upper and lower margin shaded, tips of fore femora and bases of middle and hind femora, and bases and apices (or only the latter) of middle and hind tibiae including all tarsi, pale yellow; joint 1 of the antennae dark, 2 and 3 pale yellow (in dark specimens 2 at extreme base and 3 towards apex, especially above indistinctly shaded), 4 more or less grey, somewhat lighter than the following joints, particularly below; wings banded, hyaline, with a broad dark cross-bar before middle, and the apex broadly dark. The sense-area of joint 3 is rather fine but distinctly widened towards its ends though its extreme apices are somewhat bent downward at least on one side; on joint 4 it is a little broader, though varying, and not parallel with the apical margin, at least on one end; joint 3 distinctly longer than 4; bristle-bearing pores on joint 6 rather irregularly arranged, and scattered. Cephalic bristles, interocellars and post-ocellars 56-60 μ; head length (total) 148, (from eyes) 132 μ, width 180 (somewhat distended); eyes length (laterally) 68-70 μ. Pronotum length 144 μ; prothoracic bristles, interior antero-marginals 60 μ, antero-angulars 48-56 μ, laterals 80, postero-angulars 84-88 μ; at the hind margin, within, there are 5-6 pairs of bristles, the third pair of which is sometimes — but not always — premarginally situated; the inner premarginals are far distant form the hind margin (16-18 μ); the innermost postero-marginals are situated comparatively closely together, not farther distant than the first premarginals from each other. Hind tibiae, length 240-260 μ, with moderately long and stout yellowish spines, spine at base of hind tarsi 28-30 μ, an interiorly situated one near apex of tibia 40-45 μ; preapical hairs wanting. Pterothorax width 285 μ, width of wings (across median cross-vein) 128-134 μ; upper vein of fore wings with 7-9 bristles in its apical portion. Sternites with 1 pair of accessory bristles on III, none on the following sternites (in the type specimen). Antennae length 398-407 μ; measurements of joints: 25-28(34), 45(28), 66-67(23), 62(20), 45(20), 59(19), 42(17), 27(12), 28(9) μ. Bristle 1 on

segment 9 of the abdomen 104, the longest, mid-lateral, 132 μ. — This description is made after a para-type specimen (ex coll. Dr. P. Buffa, in coll. J. D. Hood).

To this may be added the description of a co-type specimen of *M. angusticeps* Bagn. (ex coll. Bagnall; from Cholsey, England). Colour as in the above but less faded; sense-areas the same; structure of joint 6 also identical; interocellar and postocellar bristles 40-44 μ; head length (total) 162, (from eyes) 140-144, width 166 μ; eyes 70-74 μ; pronotum length 140 μ; prothoracic bristles, interior antero-marginals 44-48, antero-angulars 48-50 μ, laterals somewhat over 70 μ, postero-angulars over 76 μ; hind margin with 6 pairs of smaller hind marginals within the postero-angulars, the preapicals and the innermost postero-marginals situated as in the above type; pterothorax 268 (normal distension); wings of the same length as in the above type (848 μ) and very little narrower 125 μ; upper vein with 9-10 distal bristles. Hind tibiae length 248 μ; sternites probably with 1 pair of accessory bristles on III and 1 pair on IV (abdomen mounted laterally). Antennal joints: 28(34), 45-46(29), 64(22), 56-59(22), 45(19), 59(22), 42(19), 25(12), 31(10) μ. Bristle 1 on segment 9 96-100, b. 3 (mid-lateral) 132 μ.

Male (specimens from Villefranche, 1.5.27, coll. O. John): Also this sex is varying in the shape of the sense-areas of joints 3 and 4, sometimes they are broader on one antenna than on the other of the same specimen, agreeing with the female. Interocellar bristles 28, postocellars 32 μ; antero-marginals of the pronotum about 30, laterals 36-40, postero-angulars 48 μ; hind margin with 5 pairs of bristles interiorly. Accessory bristles, sternite III with 1 pair. Spines on tergum of segment 9 weak, bristle-like, the posterior pair widely separated (74 μ). Antennae length 310-355 μ; measurements of joints: 24(27-28), 44(36), 56(20), 48-50(20), 40(19), 52-54(21), 31-32(18), 20(13), 24(8) μ.

Habitat: England, France, Italy. — John found it in flowers of *Lamium album*, Bagnall in those of *Helianthemum chamaecistus*.

Melanthrips anglicus nov. (spec. or var.?)

(Plate II, Fig. 12)

M. ficalbii, Bagnall (nec Buffa), Ent. M. Mag. (3), X, 1924, p. 2.

Described after 1 specimen from Yarnton (June 1913), England, coll. Bagnall (ex coll. Hood).

A somewhat crushed specimen, colour pale, faded as in pale specimens of *ficalbii*; postoculars ab. 40 μ; head (total) 128, (from eyes) 116-120 μ, width not measurable; eyes (lat.) 60-62 μ; pronotum length 110 μ; antero-marginal bristles 40-43, laterals ? 56 μ, postero-angulars 60-64 μ; hind margin with 6 pairs of smaller postero-marginals within the postero-angulars, the preapical

and the innermost postero-marginals situated as in *ficalbii*; pterothorax width 240 μ; wings length 675-690 μ, width about the middle 90-92 μ; upper vein with 7-9 distal bristles; hind tibiae 200-208 μ; sternite III with 2 pairs, IV with 1 pair of accessory bristles; antennae length 355 μ; joints, 28(28), 42(26), 52-53(20), 48(21), 42(20), 48(19), 36(17), 24(13), 27(10) μ. Bristles 1 on segment 9: 88 μ, the mid-laterals (b. 3) 102-108 μ.

This is obviously the form which Bagnall compared with *angusticeps* when describing the latter (Ent. M. Mag. (3), X, 1924, p. 2, 3); it is no doubt smaller, having shorter bristles and apparently somewhat broader head (the specimen at hand however is a somewhat crushed one). Having had only one specimen for examination, I have not been able to get convinced of the validity of this species; I cannot see any striking difference between this form and *M. ficalbii*, although the measurements are quite different.

Melanthrips rivnayi spec. nov.

(Plate II, Fig. 15)

Female: This species, though having banded wings as the two preceding forms, is fundamentally different from them. Colour similar but the apices of the tibiae are not, or not distinctly yellowish, and the fore femora have no yellow tips; joint 3 shaded at apex (obliquely), 4 wholly dark or but below at base with a pale spot; fore tibiae wholly yellow, only somewhat shaded at outer margin, fore tarsi light, very slightly shaded, middle and hind tarsi greyish, lighter at base; the dark median cross-bar narrower than in *ficalbii* and *anglicus*. The insect is more stoutly built than the two former. Sensory areas on joints 3 and 4 are developed as broad, reniform areolas, having a width of 7-8 μ; antennal joints much more distinctly and densely set with microsetulae sitting on ringlets. Measurements of antennal joints: 36(?), 60(31), 86-92(22), 78-86(24), 52-60(25), 68-74(28), 28-36(22), 24-26(19), 32-36(12) μ. Joint 6 thick, 7 oval. Head length 155-165 μ; cephalic bristles, interocellars 68-72, postocellars 60-65 μ, attaining the hind margin of the vertex, third pair of postoculars (from within) long, 80 μ. Pronotum length 173-176 μ; prothoracic bristles, inner antero-marginals 64-68, antero-angulars 76, laterals 88-96, postero-angulars 104-108 μ; the lesser postero-marginals, within, in 6-7 pairs, besides, there are 2 pairs of pre-marginals, the interior of them small, the exterior large (64-72 μ). Hind tibiae, length 337-346 μ, without preapical hairs but with regular rows of stout spines, the longest about 50 μ; hind femora with two long and stout bristles at outer margin, 46 and 60 μ, respectively. Upper vein of fore wings with 8-9 bristles at its apical portion. On the sternites, one should expect a rich assortment of accessory bristles but this is not the case; sternite III has 1 pair of accessory bristles or they are entirely wanting on sternites III-

VII. Sternite VII with 6 pairs of hind marginal bristles but 2 and 3 of them extremely minute. Bristle 1 of segment 9, 130-136, the longest, mid-lateral, 136-140 μ; length of segment 9, 112 μ.

Male: Sensory areas as in the female, reniform, broad. Interocellar bristles 56, postocellars of the same length. Length of pronotum 148-152 μ, prothoracic bristles: inner antero-marginals 56, antero-angulars 58-60, laterals 76, postero-angulars 85 μ; 6-7 pairs of lesser postero-marginals, and, as in the female, two pairs of premarginals, the exterior of them much longer and stouter (60 μ) than the interior (32 μ). Sternite 1 with net-like structure in the middle (in *ficalbii* faintly indicated), sternite III with 1, sternite IV with 0-1 pair of accessory bristles. Antennae as in the female, joint 6 is very long, and in distal half set with about 5 cross-rows of bristle-bearing pores; measurements of antennal joints: 40, 52-54, 88-92, 76-84, 51-56, 84-94, 24-26, 18-20, 26-28 μ. The sexual organs are entirely different from those of *ficalbii;* whilst in *ficalbii*, the lateral parts of the penis are gradually narrowed, in lateral aspect, and the central part is rounded at tip (much shorter than the lateral halfs), in *rivnayi*, they are bent upwards and truncate at apex, provided with two long teeth, at apex below; the central part is shaded with grey, curved upward, widened toward apex, and broadly truncate. The posterior pair of dorsal spines of segment 9 is 60 μ distant; the stout lateral, hind marginal bristle of segment 9 measures about 105 μ; segment 10 split above, or deeply incised, for some distance.

Habitat: Palestine, Zichron Yakov, 22.2. and 3.3.32, in flowers of *Prunus amygdalus* (E. Rivnay coll.).

Table on the species of the Genus Melanthrips.

A(B) Fore wings uniformly greyish, or pale at base, not banded .... (Subg. Melanthrips Hal. s. str.).

1(18) Fore wings lighter in colour at base, costa always colourless at base.

2(11) Hind margin of pronotum, in both sexes, with 6-7 pairs of bristles *within* the postero-angulars (Plate I, Fig. 1).

3(4) Sense-area of joint 4 of the antennae has the shape of an areola; there are always two pairs of ante-marginal bristles at hind margin of pronotum. Hind tibiae without ante-apical hair ..... *areolatus* sp.n.

4(3) Antennal joint 4 with filiform sensory area. Hind tibiae with 1-2 ante-apical hairs.

5(6) Mid-lateral bristle of pronotum shorter, 52-56 μ. Antennae slender, joint 6 about 70 μ; wings broadly colourless at base; male, with mid-lateral prothoracic bristles about 40 μ long; lesser number of distal

upper vein bristles ..... *sudanensis* sp.n.

6(5) Mid-lateral prothoracic bristle longer, 80-108 μ; 56-58 μ in the male.

7(8) Hind tibiae with *one* conspicuous ante-apical hair; joint 6 of the antennae 50-60(24) μ in the female, and about as long in the male; eyes length 64-78 μ [10] ..... *fuscus* (Sulz.)

8(7) Hind tibiae usually with *two* conspicuous ante-apical hairs at outer margin; joint 6 of the antennae longer; eyes length [10] 80-88 μ.

9(10) Antennae shorter, stouter, joint 4, 76-79(26-27) μ, 6, 63-72 (22-25) μ ..... *gracilicornis* Maltb.
(*falcatus* Melis and *bisetosus* Bagn.)

10(9) Antennae longer, more slender, joint 4, 80-82(25), joint 6, 72-74 (21-22) μ ..... *libycus* sp.n.

11(2) Hind margin of pronotum with 4-5 pairs of bristles within the postero-angulars (Plate I, Fig. 2). Hind tibiae with weak, more bristle-shaped spines.

12(13) Sense-areas on joints 3 and 4 of the antennae short, and exactly circumpolar, semicircularly following the apical margin of the joints, Sternite III with 2-3, IV with 1-2 pairs of accessory bristles, in the female. Apical part of upper vein of the fore wings with 7-8 bristles.. ..... *pallidior* Pr.

13(12) Sensory areas of joint 3 and particularly of joint 4, do not follow exactly the apical margin of the joints, they are more or less bent downward.

14(15) Sensory areas broad, and much widened at their tips (Plate II, Fig. 8) ..... *knechteli* sp.n.

15(14) Sensory areas slender, not or not noticeable widened apically.

16(17) Terminal antennal joints long and slender, sensory areas of joints 3 and 4 as in Plate II, Fig. 7; length of postero-angular prothoracic bristle 96-105 μ ..... *arabs* sp.n.

17(16) Terminal antennal joints shorter; sensory areas as in Plate II, Fig. 5, 6; postero-angular bristle of the pronotum 67-80 μ .... *separandus* sp.n.

18(1) Fore wings wholly dark.

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[10] Distance from fore angle to hind angle (laterally), measured *dorsally*.

19(26) Antennae shorter, joint 4 : 50-68 μ, in the female.

20(23) Hind tibia without preapical bristle ; prothoracic bristles shorter, midlaterals up to 68 μ.

21(22) Sensory areas strongly oblique, on joint 4 nearly attaining the middle of the joint ; antennal 3 about 60(28) μ, distinctly shorter than 4 ; interior premarginal pronotal bristle very close to hind margin ; antennal joint 9, 39-42(11) μ long. ..... *bagnalli* sp.n. (11)

22(21) Sense areas less oblique (Plate II, Fig. 11) ; antennal 3 more slender ; premarginals normal, farther distant from hind margin ; 9th antennal joint shorter, 28-32 μ ..... *acetosellae* John

23(20) Hind tibia with 1 preapical bristle ; bristles on pronotum longer, midlateral 80-96 μ.

24(25) Sensory areas of joints 3 and 4 are exactly circumpolar, and short ..... cf. *pallidior* Pr.

25(24) Sensory areas longer, at least on joint 4 diverging from apical margin ..... *tristis* sp.n.
(cf. *knechteli*)

26(19) Antennae much longer, joint 4 of the female, 70-80 μ long.

27(28) Sense areas on joints 3 and 4 forming a fine pale ring which is not completely closed round the joint. Bristles on fore angles of pronotum long, 68-72 μ ; sternites V and VI with a pair of accessory bristles each ..... *nigricornis* Bagn.

28(27) Sense areas forming a fine ring, which is, irregularly undulated, decurrent almost nearly to the middle of the joint ; bristles on anterior angles of pronotum about 45 μ long. Accessory bristles wanting on sternites V and VI, in the female. ..... *matthiolae* sp.n.
(*nigricornis* Pr.)

B(A) Fore wings hyaline with two large cross-bars, one of them at apex. Antennal joints 2 and 3 light..... (Subg. *Dichropterothrips* n.sbg.)

1(4) Body bristles moderately long, posteroangulars of the pronotum 68-76 μ long ; sense areas filiform ; antennae shorter.

2(3) Breadth of wings (about the middle) of female 108-134 μ ; antennae and bristles longer ..... *ficalbii* Buffa

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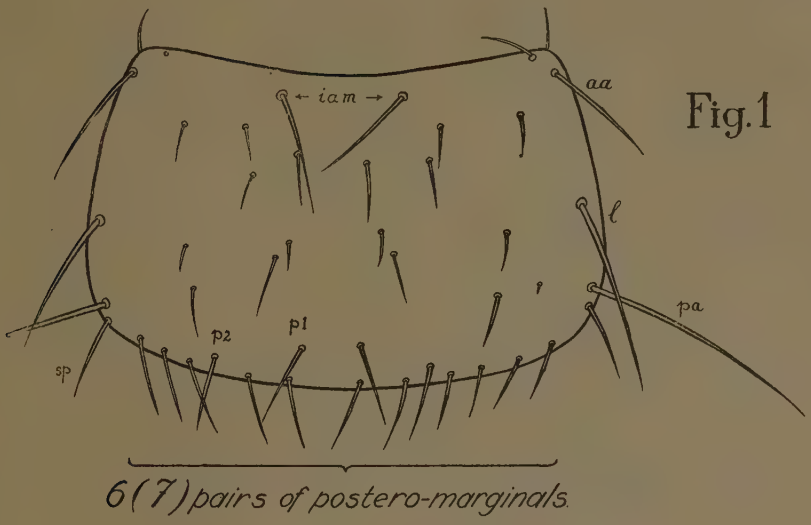
(11) Also compare *M. harrisoni* Bagn., much differing in having joint 3 65(28), joint 9 27(12.5) μ.

3(2) Breadth of wings of female 90-92 μ; antennae length 355 μ; all bristles shorter ..... *anglicus* nov.

4(1) Body with long bristles, postero-angulars of the pronotum about 108-120 μ long; sense area of joint 4 about reniform, roundish; antennae longer, joint 6 about 68, joint 7 short, about 28-36 μ long. Lateral parts of the penis have the shape of a double fishing-hook .... *rivnayi* sp.n.

H. Priesner



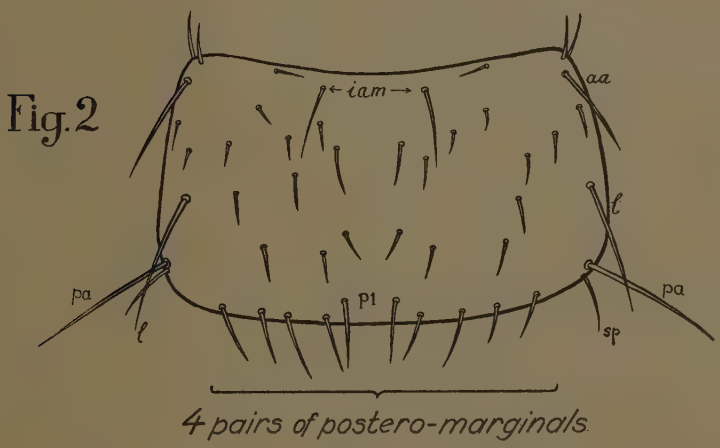


Fig. 1. — Pronotum of *Melanthrips fuscus* (Sulz.), showing the position of the bristles.

Fig. 2. — Pronotum of *Melanthrips pallidior* Pr., showing the position of the bristles.

aa = antero-angulars. — iam = interior antero-marginals — 1 = laterals. — p = interior (or 1st) premarginals. — p2 = exterior (or 2nd) premarginals. — pa = postero-angulars. — sp. = small (inferior) postero-angulars.

Explanation of Plate II

Antennal joints 3 and 4 (equal enlargement) of :

Fig. 1. — *Melanthrips gracilicornis* Maltbaek.

Fig. 2. — *Melanthrips gracilicornis* Maltbaek.

Fig. 3. — *Melanthrips libycus* sp.n.

Fig. 4. — *Melanthrips sudanensis* sp.n.

Fig. 5. — *Melanthrips separandus* sp.n.

Fig. 6. — *Melanthrips separandus* sp.n.

Fig. 7. — *Melanthrips arabs* sp.n.

Fig. 8. — *Melanthrips knechteli* sp.n.

Fig. 9. — *Melanthrips pallidior* Pr.

Fig. 10. — *Melanthrips pallidior* Pr.

Fig. 11. — *Melanthrips acetosellae* John.

Fig. 12. — *Melanthrips anglicus* n.

Fig. 13. — *Melanthrips areolatus* sp.n.

Fig. 14. — *Melanthrips areolatus* sp.n.

Fig. 15. — *Melanthrips rivnayi* sp.n.

Fig. 16. — *Melanthrips matthiolae* sp.n.

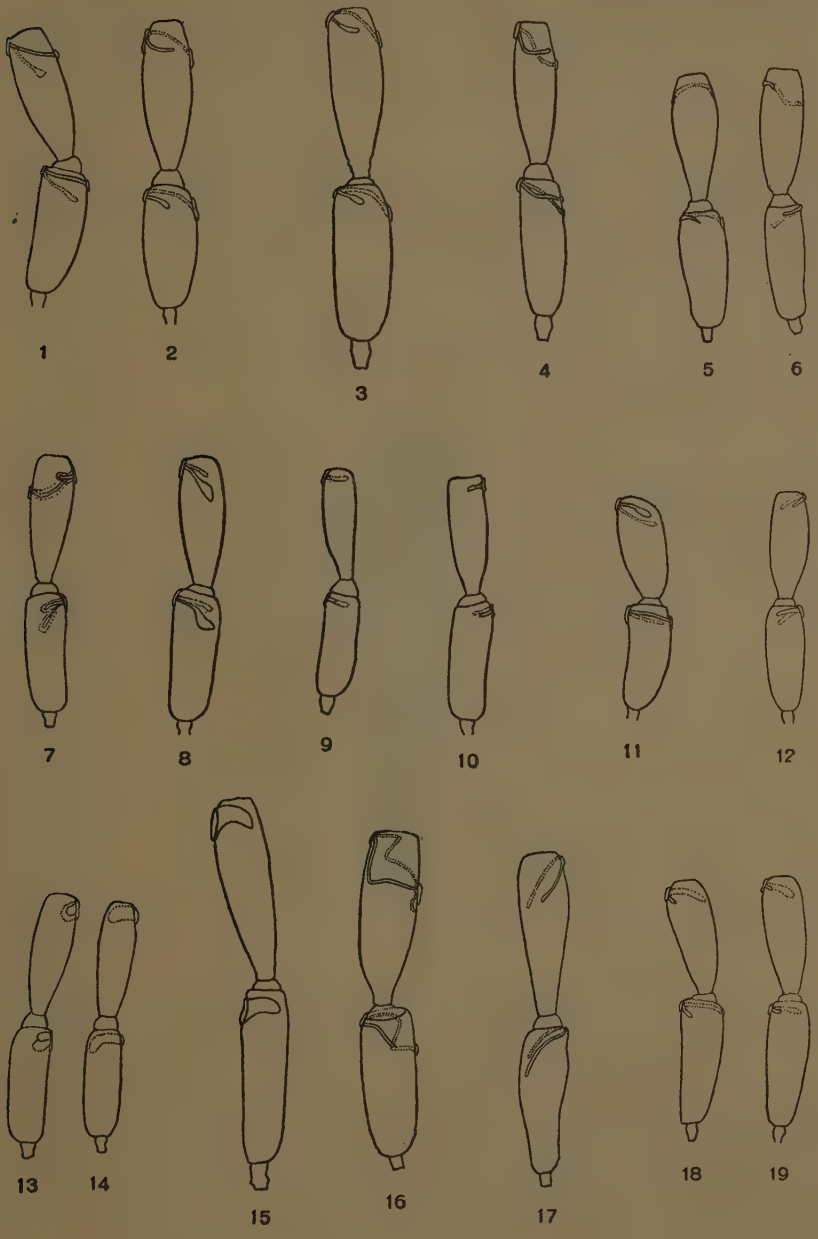
Fig. 17. — *Melanthrips nigricornis* Bagn.

Fig. 18. — *Melanthrips ficalbii* Buffa.

Fig. 19. — *Melanthrips ficalbii* Buffa.

H. Priesner

Plate II



L'*Harmolita romana* Walker en Egypte

(Hymenoptera : Chalcidoidea-Eurytomidae)

par Anastase Alfieri

Je ne connais que deux exemplaires égyptiens de cette espèce, obtenus d'une tige d'*Arundo* spec. (*bous* en arabe) rapportée des environs de Sidi-Gaber (banlieue alexandrine). La gaine entourant la tige présentait, en

Fig. 1. — *Harmolita romana* Walker, ♀. — × 20.

deux places différentes, une longue bande longitudinale de teinte pâle (Fig.2) bien distincte de la couleur foncière de la plante. Il était apparent qu'il s'agissait de l'œuvre d'une larve mineuse. A l'aide d'une épingle, j'incisais longitudinalement l'épiderme extérieur à cet endroit et le soulevais délicatement. Je constatais alors, dans chaque mine, une larve d'hyménoptère

Fig. 2.

phytophage. Un nouvel examen, effectué quelques jours après, révélait la mutation des deux larves en nymphes. Le 2 Novembre, les adultes (deux femelles) quittaient leur galerie respective par un trou d'éclosion (Fig. 2a) préparé à cet effet. Monsieur Ch. Ferrière, du Museum Britannique d'Histoire Naturelle de Londres, voulut bien se charger de la détermination de cet insecte et reconnut en lui l'*Harmolita romana* Walker (Fig. 1). Il lui fut également possible de comparer mes exemplaires avec le type de Walker, une femelle décrite d'Italie et conservée dans les collections du musée précité.

Il est à noter que la plupart des espèces du genre *Harmolita* provoquent généralement des galles à la base des feuilles ou sur les tiges des graminées. D'après ce qui précède, *Harmolita romana* Walker devra être considérée comme une espèce non productrice de galles.

Signalons enfin que les mâles d'*Harmolita* semblent être excessivement rares et que la parthogènese jouerait ici un rôle prépondérant.

Séance du 4 Mars 1936

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

The European Corn Borer, *Pyrausta nubilalis* (Hübn.) a major pest of maize in Egypt

(Microlepidoptera-Pyralidae)

by I. Fahmy, B.Sc., Ph.D. (Edin.),
in charge of Borer Investigations,
Entomological Section, Ministry of Agriculture.

About three years ago, the writer started investigating the borers of maize, sugar cane and rice, namely *Sesamia* spp., *Crambus* spp., and *Chilo* spp.. While proceeding with this work, he always had in mind the note on *Pyrausta* published in Willcocks (1), and therefore kept a sharp look out for the pest.

Pyrausta nubilalis was first recorded in Egypt by Andres (2) in 1912, since then no records of the pest are available; Andres (loc. cit.) states: « les ravages qu'elle cause de cette façon peuvent donc être très importants, mais je ne dispose pas d'observations suffisantes pour savoir si cette espèce se trouve assez répandue en Egypte pour causer des ravages importants »; he failed to mention the locality from which he obtained his infested material, but Willcocks (loc. cit.) states it would probably be Alexandria.

Storey in his list of Egyptian insects records the capture of the insect at Maadi (near Cairo), and Alfieri has specimens taken by himself in Alexandria. Priesner also captured the insect at Maadi. Willcocks (loc. cit.) states: « Although the records are but few they seem to indicate that *P. nubilalis* is widely distributed in Egypt. One wonders why it's so harmless in the country whereas in parts of Europe it may cause a loss of 50 % or more..... ».

(1) Willcocks, F.C., 1925. — Insect and related pests of Egypt, Vol. II, p. 146.
(2) Andres, A., 1912. — Note sur un nouveau ravageur du maïs : ***Pyrausta nubilalis*** Hbn. (Bull. Soc. Ent. d'Egypte, Dec., p. 20).

C. B. Williams (3) states that he found a number of larvae in maize growing near Alexandria in 1925. An investigation the following year when the maize was about the same stage of growth failed to reveal the presence of a single example.

In the summer of 1933, the writer, after enquiring from vendors of roasted maize in Alexandria, visited a field at Nozha, and on dissecting a few stalks, found a suspicious looking larva which proved on breeding to be *Pyrausta nubilalis*. The same locality was visited again in July 1933, and found on closer examination to have about 5 % stalk infestation.

This was followed by an extensive survey all over the country. The survey revealed, so far, that the insect is well and generally distributed all over Lower Egypt and throughout a section of Upper Egypt extending as far south as Bedrishin (Giza Province).

The coastal areas are the most heavily infested especially Alexandria and Damietta, where infestations of over 50 % are not uncommon, one hundred per cent infestations are found, with a high larval population ranging from 7 to 24 borers per infested plant.

Seasonal History.

Our preliminary field observations show that there are four annual generations. The first generation of moths emerge from overwintering larvae (in dry maize stalks) about the first week in May ; the second generation emerge about the end of June ; the third about the beginning of August, the fourth about the beginning of September. The full grown larvae of this generation go into hibernation in October.

That four annual generations of *Pyrausta* occur in Egypt is corroborated by data published by Clark (4) who investigated *P. nubilalis* in Japan. He established a correlation between the number of months with a normal mean temperature of 60° F. (15° C) or above, and the number of annual generations ; e.g. with seven months of a normal mean temperature of 60° F. or above, there are three annual generations and a partial fourth. In Egypt, we find (from temperature records covering a period of ten years (1919 - 1928 inclusive), that there are 8.7 months with a normal mean temperature of 60° F. or above. The same investigator (loc. cit.) further, uses the mean temperature of March as an index to climates inducing a given number of generations ; for example with a March temperature of 52° F.. there are three annual generations and a partial fourth. In Egypt, March temperature (1919-1928) is about 58° F.

(3) Williams, C.B., 1934. — The European Corn Borer in Egypt (Jour. Econ. Ent., 27, No. 3, p. 719).

(4) Clark, C.A., 1934. — The European Corn Borer and its controlling factors in Japan (U.S. Dept. Agr., Tech. Bull., No. 45).

Discussion.

Our observations for the past two seasons lead us to believe that *P. nubilalis* is the most serious maize pest in Egypt, causing considerable losses to the crop. It appears that the insect was more destructive than has been imagined; it seems surprising however, that such a notorious insect should pass almost unnoticed since being first recorded. The nature of its damage may have been confused with other maize borers, a fact confirmed by the writer in a number of cases where *Sesamia* and *Chilo* larvae were found feeding in the same stalk with *Pyrausta* larvae, sometimes their tunnels uniting.

Parasites.

The eggs of *P. nubilalis* are attacked by the egg parasite *Trichogramma evanescens;* egg parasitism may reach as high a proportion as 80 %. The larvae are parasitized by *Microbracon brevicornis* and *Pimpla ephippium* and the pupae are also attacked by the latter parasite.

A more detailed paper covering the results of our investigations will be published in the near future.

Studies on the Genus *Haplothrips* Serv.

(Thysanoptera)

by H. Priesner.

I. New characters for the differentiation of the species.

The separation of the species in the genus *Haplothrips* has always been very difficult. The great similarity of the forms in their general aspect as well as the absence of striking characters accounts for it. The coloration of the body and its appendages, the shape and length of the bristles, the shape of the antennal joints, the length of the tube in comparison with the head, and the number of the duplicated cilia of the fore wings have been and are still the most reliable characters for distinguishing the species. With the discovery by Maltbaek of the plumose fringe hairs of certain species, another useful character has been introduced.

The following notes should be a further contribution to the characterization of the species of this genus, by the introduction of a new character given by the number and position of certain extremely minute pores and bristles, situated on the tergum of the abdomen.

The tergites II - IX show in all species, and — as to my knowledge — in many other genera, without any exception in *Haplothrips* (not considering unilateral anomalities), a pair of small, circular, bristleless pores, generally situated before the middle of the tergite, closer to the fore margin on the anterior segments than posteriorly. These two pores [1] are accompanied by a varying number — one to several pairs — of very minute bristles, appearing even under high magnification as exceedingly small, clear dots. *Not only the number but also the position of these fine bristle-bearing dots vary according to the species or group of species, besides showing considerable individual variation necessitating great care in the practical application of this distinguishing character.*

There is a distinct difference in the arrangement and number of these bristles in the group of species around *H. aculeatus* F. compared with those about *H. leucanthemi* Schrk., and those of the subgenus *Trybomiella* Bagn. But it should be mentioned that there is no sharp limit, and some species seem to fall between the above named groups or show a peculiar arrangement, or are characterized even by their irregularity in this respect.

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[1] One of the two pores may be abnormally replaced by a micro-bristle.

For the practical work, I found it most convenient to restrict my attention to the assortment of these pores plus micro-bristles of two tergites only, the VIIth and the VIIIth, since they are fairly well visible also in preparations of moderate quality with which I had been compelled to content myself in many cases, owing to scarcity of material; furthermore, the segments (tergites) VII and VIII seem to me to show the greatest differences in this regard. In this paper, only the females have been considered, of many species the male being not at hand.

A common arrangement of these bristles and pores one meets in *H. aculeatus* and its allies, viz., on tergite VII two more or less closely attached pores and, at their sides, on the same plane (or somewhat behind), 2 minute bristle-pores; tergite VIII has the pores widely apart from each other, and the fine bristle-bearing pores situated within the pores but in many cases somewhat in front or exactly in front of them. The following species — and certainly others which I have not been able yet to examine (missing in my collection) — are built according to this type I (*aculeatus*-Type):

aculeatus F.; *andresi* Pr.; *cahirensis* Tryb.; *certus* Pr.; *ceylonicus* Schm.; *chinensis* Pr. (irregular; bristles on VIII in front of pores *or* behind them); *cypriotes* Pr.; *distalis* Hood; *flavicinctus* Ka.; *ganglbaueri* Schm.; *gowdeyi* Frkl. (transitional to type IV); cf. *juncorum* Bagn. (sometimes 3 bristles on VII instead of 2 pairs); *leptadeniae* Pr.; *malifloris* Hood; *mangiferae* Pr.; *minutus* Uz., Pr.; *ochradeni* Pr. (may have 4 bristles on VII); *rabinovitchi* Pr.; *subtilissimus* Hal.; *tenuipennis* Bagn.; *themedae* Pr.; *tolerabilis* Pr.; *vernoniae* Pr.

Another common type (II.) consists in the following arrangement of the pair of pores and the micro-bristles on the disk of the tergites VII and VIII. as e.g. in *H. leucanthemi* Schrk.: Pores on VII not so close to each other as in the former group, and in all cases 1 pair of micro-bristles on each of the tergites VII and VIII, *behind* the pores, thus the distribution of pores and bristles on VII about equal to that on tergite VIII. The following species fall into this « group » II:

alexandrinus Pr.; *alpester* Pr.; *angusticornis* Pr.; *arenarius* Pr.; *biformis* Mlt. (3 bristles on VIII); *bodenheimeri* Pr. (pores on VII *very* close); *chrysanthemi* Pr.; cf. *chinensis* Pr.; *distinguendus* Uz. and var. *crassus* Ka.; *ebneri* Pr.; *euphorbiae* Pr. (3 bristles on VIII, pores on VII close); cf. *floricola* Pr.; *fuliginosus* Schille; *fumipennis* Pr.; *fungicola* Pr.; cf. *giganteus* Pr. (usually 2 pairs of bristles on VII); *hispanicus* Pr.; *imperatae* Pr. (on VII, pores close, bristles in front of pores); *incognitus* Pr.; *inquilinus* Pr.: *inquinatus* Ka.; (*kraussei* Pr.); *leucanthemi* Schrk.; cf. *montivagus* Pr. (pores on VII on the same plane as bristles); *morisoni* Pr.; *niger* Osb.; *palestinensis* Pr.; *pictipes malayensis* Pr. (pores and bristles on VII very close); *sedicola* Bagn.; *senecionis* Bagn.; *setiger* Pr. (may have 3 bristles on VIII) and var.

canariensis Pr. ; *simplex* Buffa, Ka. ; *statices* Hal., Bagn. ; *tenebricosus* Pr. ; *tritici* Kurdj. ; *vuilleti* Pr.

Other species have 1 pair of micro-bristles (rarely 3 bristles as a whole) on VIII and 2 pairs on VII (group III) :

acanthoscelis Ka. (usually 3 bristles on VIII) and var. *salloumensis* Pr. : cf. *andryalae* Pr. (see also next group) ; *cottei* Vuill., Pr. ; cf. *atriplicis* Pr. ; cf. *derisor* Pr. (usually 2 pairs on VII and VIII but sometimes 3 bristles only on VIII) ; cf. *eragrostidis* Pr. ; *giganteus* Pr. ; *juncorum* Bagn. ; *limoniastri* Pr. ; *purpuratus* Hood ; *retamae* (End.) ; cf. *reuteri* Ka. (has 3 or 4 bristles on VIII, 2-4 pairs on VII) ; cf. *wouramboulchii* Mlt. (2-3 pairs on VII).

The following species (group IV) have 2 pairs of micro-bristles on the disk of each of the tergites VII and VIII :

acanthoscelis Ka. ; *andryalae* Pr. ; *atriplicis* Pr. ; cf. *bagnalli* Tryb. (may have 4 pairs on each) ; *clarisetis* Pr. ; *derisor* Pr. ; *dianthinus* Pr. ; cf. *distinguendus* Uz. ; *eragrostidis* Pr. ; cf. *faureanus* Pr. (irregular, has usually 3-4 pairs on each) ; cf. *fiebrigi* Pr. (irregular) ; *strigae* Pr. ; *halophilus* Hood ; *jarvisi* Moult. ; *jordanicus* Pr. ; cf. *limoniastri* Pr. ; *nigricornis* Bagn. ; cf. *odontospermi* Pr. (3-5 bristles on VIII) ; cf. *pharao* Pr. (may have 3 pairs on both tergites) ; *reichardti* Pr. ; cf. *retamae* End. (irregular) ; cf. *reuteri* Ka. (2-4 pairs on VII, 1-2 pairs on VIII) ; cf. *robiniae* Pr. (2 pairs on VIII, 1-2 pairs on VII) ; *sesuvii* Pr. ; cf. *tritici* Kourdj.

The largest number of fine bristles one meets in the following group (V), comprising *Chiraplothrips* Pr. and almost all the species of *Trybomiella* Bagn., viz., more than 2 pairs of micro-bristles on VII or on VIII, or on both :

cf. *atriplicis* Pr. ; *bagnalli* Tryb. ; *caespitis* Pr. ; cf. *eragrostidis* Pr. ; *faureanus* Pr. (there may also be 4 pores instead of 2) and var. *sudanensis* Pr. ; *fiebrigi* Pr. ; *heliotropii* Pr. ; *pharao* Pr. ; *ramakrishnai* Ka. ; *robustus* Bagn. ; cf. *sesuvii* Pr. ; *talpa* Pr. ; *tardus* Pr. ; cf. *tritici* Kurdj.

There remain a few species which are difficult to assign to one of the above groups owing to the irregularity in the arrangement and the number of the miro-setae, as *H. cameroni* Pr., *apicalis* Bagn., and also *eragrostidis* Pr. ; in *H. imperatae* Pr., the set on VIII is normal, as in *leucanthemi*, but on VII the micro-setae (1 pair on each segment) are situated on a higher plane than the pores (close to each other) ; in *H. robustus* Bagn., there are 3 pairs of micro-bristles between the pores on VIII, and 2-3 pairs behind the pores on VII ; *H. eothripinus* Pr. has 1 pair of micro-setae on VII, 2 pairs on VIII ; *H. atriplicis* Pr. (very irregular), and *H. rivnayi* Pr. sometimes show the same arrangement.

Finally, some conclusions may be drawn from the above examplifications :

(1) The arrangement of the pores and micro-setae on the disk of at least the tergites VII and VIII of the *Phlaeothripidae*, though they are subject to

considerable variations (²), should henceforth be mentioned in the descriptions.

(2) The Subg. *Hindsiana* appears to be closer to the « *H. aculeatus*-group » than to others, e.g. the « *leucanthemi*-group » and can therefore no more be considered as a subgenus.

(3) Our present view of the relationship of the species is, as a whole, confirmed, rather than altered by the introduction of the above new character.

(4) The character in question may be made use of with advantage in other genera of the *Phlaeothripidae*.

II. The Haplothrips-species of Palestine, with notes on the « plumociliatus-group ».

The following notes and descriptions are based upon material collected by Prof. Dr. F. S. Bodenheimer (Hebrew University), Dr. E. Rivnay (Rehoboth Experiment Station), and Mr. A. Rabinovitch (Cairo) to whom my thanks are due for their kind spirit of collaboration.

There is only one species of economic importance amongst the material, viz., *H. tritici* Kurdj., a pest of wheat. The most common form however appears to be *H. palaestinensis* n.sp., a flower thrips inhabiting the inflorescenses of various species of *Compositae;* the biologically most interesting species is *H. atriplicis* Pr. which is found in great numbers in the « Wirrzopf »-galls of *Atriplex halimus*, produced by the gall midge *Asphondylia punica* March.; the thrips was known to Bodenheimer long ago (Bull. Soc. Roy. Ent. d'Egypte, X, 1926, p. 69-71), it is an inquiline of the galls, living between the small leaves of them; its habits are not yet known.

1. Haplothrips (Trybomiella) jordanicus spec. nov.

This species comes very close to *H. articulosus* Bagn. from Tanganyka but differs in having shorter antennae with joint 3 very short and angular, 4 only about 1.4 times as long as broad, joint 3-5(-6) of the antennae wholly yellow, and having longer prothoracic and basal wing bristles.

Female: Dark brown with rich mesodermal pigmentation, also in the head, the femora and tibiae; fore tibiae yellowish towards apex, fore tarsi yellowish; middle and hind legs wholly dark; joints 1 and 2 of the antennae dark, 3 to 6 clear yellow, 7 and 8 light brown; wings clear except basal plate which is brownish; bristles light, anals shaded at base.

Head of normal shape, length 200 (including interantennal projection 216) μ, width 180-185 μ; eyes length 72, cheeks behind them 144 μ; posto-

(²) The examination of a *series* of specimens is necessary, and therefore, some of the above named species may be still more irregular, as could be gathered from the material at hand.

culars 40-48 μ; blunt, 12 μ distant from the eyes; mouth-cone short but not very broadly rounded; antennal joints 3-8: 38(28), 46(32), 43(28), 43-45 (24), 36(20), 28(11) μ; joint 3 short, angular, asymmetrical, 4 less so and decidedly longer, 3 with two, 4 with four sense-cones. Pronotum length 152 μ; antero-angular bristles 44-48 μ, well developed, postero-angulars 68-72 μ, interiors about 60 μ, all blunt; fore legs normal, fore tarsi with a small tooth. Pterothorax width 372 μ; wings moderately broad, length 880 μ approximately; basal wing bristles blunt or knobbed, 48, 56, and 62 μ; wings *without* double-fringe; fringe-hairs smooth. Bristles on segment 9 of the abdomen, b.1 rounded at tip, 80 μ, b.2 and 3 pointed, 60 μ and 80 μ, respectively; length of segment 9, 90 μ; length of tube 122 μ (dorsally) or 130 μ (laterally), width across base 64, apically 35 μ; anal hairs 128 μ. Hind tibiae 180-188 μ. Tergite 8 is provided with 2 pairs of dorsal micro-bristles, in a line somewhat behind the pores which are moderately distant (90 μ); the same applies to tergite 7 but its pores are only 55 μ separated from each other, in the unique specimen.

Male (oedymerous form): Head and antennae more slender, fore legs strongly enlarged, fore tarsal tooth broadly triangular; coloration the same as in the female, joint 6 may be somewhat shaded apically, in dark specimens; fore tibiae yellowish, with dark margins; postero-angulars of prothorax yellowish.

Head length 192(204), width 188-192 μ; eyes 70 μ; postoculars 44-48 μ, not quite sharp; antennal joints 3-8: 42(25-26), 48-50(28-31), 46-48(25-26), 42(21-22), 38-40(17), 28(12) μ. Pronotum length 148-152, width without coxae 310 μ; antero-angulars 40, postero-angulars 68-72 μ, blunt. Basal wing bristles 40-45, 48-56, 48-52 μ; pterothorax width 329-337 μ; b.1 on segment 9, 100 μ, pencil-shaped, b.2 pointed, 28-32 μ; tube length (dorsally) 142, or (laterally) 148 μ, basal width 60, apical width 34 μ; anal hairs 125 μ.

Habitat: Palestine, Jordan Valley, 4.11.1930, on *Atriplex halimus* (Bodenheimer, AR V/51).

2. Haplothrips (Trybomiella) tardus Pr.

Habitat: Palestine, Hedera, 15.10.1931, in Composite (E. Rivnay coll.).

3. Haplothrips (Trybomiella) clarisetis Pr.

Habitat: Palestine, Jordan Valley, Allenby Bridge, 27.7.35 (A. Rabinovitch coll.); Wadi Zerka, 23.4.35, *Anthemis* sp.; Massada, Dead Sea, 11.4.32, thistle (E. Rivnay coll.); Transjordania, Mizraa, 13.4.32, *Cruciferae* (E. Rivnay coll.).

4. Haplothrips reuteri (Karny).

Habitat: Palestine, 3, 4, 7, Nazareth, Tiberias, Hemme, Tel Or, Ei Zion, Kfar Giladi, Nahalal (Jordan), in *Chrysanthemum*, *Matricaria*, *Helianthus*, *Aster*, *Yellow Thistle* and *Cruciferae* (E. Rivnay and A. Rabinovitch coll.).

5. Haplothrips hispanicus Pr.

H. distinguendus var. *hispanicus* Priesner, Sitzgsb. Akad. Wiss. Wien, CXXXIII, p. 533, 1924.
H. distinguendus var. *hispanicus* Priesner, Thys. Eur., 1928, p. 577.

This form is specifically different from *H. distinguendus* by its smaller size, the relatively longer terminal antennal joints, the lesser number of double-fringe hairs, the shorter bristles of tergite 9, and the *distinctly plumose fringe-hairs*. It is easily separated from the other species having plumose fringe, by the light coloration of the antennae, resembling that of *H. distinguendus* Uz. though they are more faintly and less abruptly shaded; in paler specimens, joints 3-6 are almost entirely yellow, in the darker, joint 3 has a greyish spot above, whilst joints 4-6 are shaded less intensively and less abruptly than in *distinguendus* but to a larger extent. *H. hispanicus* is more closely related to *distinguendus* than to the other species having plumose fringe hairs.

Head short, length 173 (total 190) μ, width 173 μ; cheeks slightly arched, eyes large, laterally 68-80 μ; postoculars well developed, pale, pointed, 40-55 μ, their distance from the eyes 12-14 μ; antennae length 310 μ; measurements of joints: 24-26, 44-46, 46-52(26-28), 48-54(32), 44-50, 42-50, 38-46, 32-36 μ; joint 3 asymmetrical, with two, joint 4 with four sense-cones; terminal joint pointed. Pronotum length 116-128 μ, width without coxae 240-277 μ; antero-angular bristles very moderately long, 28-32 μ, postero-angulars well developed, 55-60 μ, pointed or nearly so, pale yellowish or slightly shaded; fore tarsi with a very small tooth; mesothorax width 285-345; basal wing bristles pointed or practically so, varying in length, 48-60 μ, b. 1 may be duplicated, pale to slightly shaded; shape of wings as in *distinguendus* but fringe hairs distinctly plumose; 4-8 hairs duplicated; dorsal pores on tergite 7 (having a distance from each other of about 25 μ) with 1 pair of micro-bristles behind them, farther distant from each other; pores on tergite 8 moderately far apart from each other (ab. 40 μ), the single pair of micro-bristles exactly behind them, i.e., of the same distance, or somewhat farther distant from each other; bristle 1 on segment 9 68-80 μ, b.2 ab. 60-80 μ, fine, practically pointed, colourless; tube length 116-124, width 52-56 basally, 31 apically; anals 106 μ.

Male unknown.

Habitat: Spain, Sierra Nevada (3481 m.), 7.8.24, carried by the wind

on snow-fields (R. Ebner coll.); Palestine, Et Zion, 24.7.35 (A. Rabinovitch coll.); Sinai, W. Arefet-el-Nagaa, on the road Kosseima-Kuntilla, 25.5.35 (A. Rabinovitch coll.).

6. Haplothrips palaestinensis spec. nov.

One of the most common species of this genus in Palestine; it also occurs in Cyprus.

Female: Almost wholly blackish brown with fore-tarsi greyish yellow; wings colorless or very slightly shaded, basal plate brown; antennae dark, joint 3 brownish yellow and at base, cloudily shaded above, 4 and 5 somewhat paler at extreme base or entirely dark; in lighter specimens, joint 3 is more slightly shaded, yellowish with a grey dorsal patch, apically, 4 and 5 pale in basal third, and even 6 may be paler at base. Bristles dark, also the basal wing bristles shaded, only the brsitles on segment 9 and other lateral abdominal bristles pale except their base which is shaded.

The general appearence of this species is that of *H. setiger* Pr., and it is most closely allied to it.

Head length (holotype) 190, width 182 μ, in other cases 183(190) μ long (broad); eyes length 84-88 μ; mouth-cone very short, broadly rounded; postoculars long, pointed; antennae length 363 μ; joints, 25-28 (b.35, t.27), 45(28), 53(28), 56(32), 52(27), 47-49(22), 45(20), 36(12) μ; structure as in *setiger;* prothoracic bristles *pointed*, antero-angulars very small, postero-angulars moderately long, 64-84 μ, *interiors well developed*, 36-40 μ; pterothorax width 370 μ in holotype; basal wing bristles *pointed*, 52-60, 52-76, and 48-70 μ, their distances 32-40, 24-32; 7-10 cilia duplicated; fringe hairs very distinctly plumose. Bristles on segment 9 short, b. 1, 70-72, b. 2, 60, b. 3, 80 μ; tube longish, dilated at base, length (dorsally) 140-148, (laterally) 160 μ, width across base 56-59, across apex 32-34 μ. Fore tarsi with very small tooth.

Male (allotype): Oedymerous form; the gynaecoid from is less common. Antennae length 355 μ; joints, 24, 46, 54, 56, 52, 48, 44, 34 μ; head 182(173); basal wing bristles 60, 60, 48; all bristles pointed; interior postero-angulars on prothorax varying from small (in oedymerous forms) to 40 μ in smaller ones; tube (dorsally) 148, (laterally) 160, width (basally) 58, and (apically) 36 μ; bristles 1 on segment 9, ab. 96, b. 3 ab. 128 μ; width of penis apically (apex of ductus) 10-11 μ (in *setiger* 13 μ).

Habitat: Palestine: Many localities, from the costal plane as well as from the hills between Tel-Aviv and Jerusalem, the species being certainly a mediterranean element, found from February to April, in the following flowers: *Chrysanthemum, Senecio* (incl. *S. vernalis*), *Matricaria, Thrincia tuberosa, Aster* and *Cruciferae* (coll. F. S. Bodenheimer and E. Rivnay).

This species is a true member of the *plumociliatus*-group (3) ; this group may be divided into two sections, one having long, the other short bristles on segment 9 of the abdomen. To the first section belong the species : *dianthinus* Pr., *reichardti* Pr., *odontospermi* Pr., *reuteri* Ka., *satanas* Bagn., *tenuicornis* Bagn. and *tenuisetosus* Bagn., of which *satanas* and *tenuisetosus* have to be considered as doubtful a long as they have not been compared with *reuteri* Ka. which varies considerably ; moreover, the former (*satanas*), was described on an unique male specimen (4) ; *tenuisetosus* Bagn. is either *odontospermi* or *reuteri*, even these two forms are not certain to be specifically different (Priesner, Bull. Soc. Roy. Ent. d'Egypte, 1931, p. 251). The second section (short bristles on segment 9 of the abdomen) may be split into two, separating the species having prothoracic and basal wing bristles sharply pointed, from those in which they are somewhat blunt (cf. *setiger*) ; it should be stated here, however, that in specimens which were preserved in rather dry condition (body containing little water), the tips of the bristles may be collapsed, and may therefore make the impression of pointed bristles ; thus I believe, that *kraussei* Pr. is nothing else than *setiger*, based on shrunken specimens. There is therefore only one species hitherto known, having absolutely pointed bristles, viz., *palaestinensis*, described above ; in all the other forms : *setiger* var. *canariensis* Pr., *setiger* var. *inulae* nov. (5) (both may be specifically different from *setiger*), *setiger* Pr., *alexandrinus* Pr., *plumociliatus* Maltb., *sedicola* Bagn., *uzelianus* Bagn. and *microsetosus* Bagn., — the basal wing bristles and the prothoracics are somewhat blunt. *H. hispanicus* Pr., redescribed in this paper, falls between the *reuteri*- and *plumociliatus*-section, having moderately long bristles on segment 9.

7. Haplothrips distinguendus var. crassus Karny.

Habitat : Not rare in Palestine : Hemme, 15.4., on *Sinapis ;* Tiberias, 8.3.35, on *Aster ;* Dagania, 13.4., on *Raphanus ;* Zichron Yakouv, 5.32, on *Cephalaria joppensis ;* ibidem, 27.3.32, on ? *Scabiosa ;* Rosh Pina, 9.3.35, in apricot flowers ; Kfar Naum, 8.3.35, on *Chrysanthemum* (coll. E. Rivnay) ; Et Zion, 24.7.35 (coll. A. Rabinovitch).

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(3) I do not consider this group as a natural one but it may be maintained for facilitating identification; Bagnall was the first who found this character in other species than *plumociliatus* Maltb.

(4) The lengths of the bristles and other characters vary enormously in the males of *Haplothrips*; descriptions of species of this genus should therefore not be given unless more is available than an unique male specimen.

(5) As *canariensis* but interior postero-angulars of the pronotum well developed, 24-44 μ long. — Canary Islands, Gomera, 28.4.31, on *Inula sericea* L. (coll. E. Titschack).

A re-examination of Karny's types and the specimens collected by myself in Albania reveals the fact that there is no specific difference between *crassus* Karny and *distinguendus* Uz.; Bagnall's note on this form (*crassus*) (Ann. Mag. Nat. Hist., (10), XIV, 1934, p. 497) must therefore refer to another species; in *crassus*, the tube measures 160-165 (68 — 36-40) μ, in *distinguendus*, I found the following measurements: 156-180 (66-70 — 36-40) μ; the only difference between *crassus* and *distinguendus* lies in the colour of the antennae, in *crassus* the yellow colour being more prevalent.

8. Haplothrips moestus Pr.

H. distinguendus var. *moestus*, Priesner, Thys. Eur., p. 724, 1928.

A further specimen of this form — hitherto known from an unique specimen — was communicated to me by Mr. H. v. Oettingen who found it on a dry meadow, 6.8.31, at Landsberg a.W., Germany; the type specimen originates from Hungary.

Female: Blackish or blackish brown with much mesodermal pigment; legs dark, middle and hind tarsi somewhat lighter, dark yellowish grey, fore tibiae dull yellowish, margins dark, fore tarsi yellow; joints 1, 2, 7 and 8 of the antennae dark, 6 also dark but somewhat lighter than the former, 3-5 yellowish brown but much irregularly shaded; the yellow colour of joint 3 and 4 is — spot-like — more prevalent at the margins. Wings clear, except basal plate which is brownish; bristles on prothorax, basal wing bristles and those on segment 9 of the abdomen yellowish.

Head broadest across eyes which are very large, head length 242-251 μ, width across eyes 218 μ; cheeks tapering towards base, more strongly constricted before base; eyes length (laterally) 108 μ; cheeks behind them 160 μ; postoculars long, pointed, length at least 72 μ, their distance from the eyes 24 μ; mouth-cone short, rounded; antennae length 380-400 μ; measurements of joints: 31(b. 36), 56(33), 56(33), 64(34), 62(29), 53(25), 53(22), 39(12) μ; joint 3 somewhat asymmetrical, with two sense-cones; terminal joint slender. Pronotum length 180 μ, width 330 or (including coxae) 355 μ; antero-angular bristles moderately long, *pointed*, as *all the other bristles*; postero-angulars moderately long, 68-80 μ; the interior postero-angulars well developed, ? 60 μ; fore legs rather stout, width 112 μ; fore tarsi with small tooth. Pterothorax width 398-407 μ, length about 415 μ; wings large, and fairly broad, length 1,14 mm.; fringe not plumose but rough, 13-14 cilia duplicated; basal wing bristles 60, 60, and 72 μ, sharply pointed, central distances 28 and 24 μ. Tergite 7 with discal pores not very close together and 3 pairs of micro-bristles around them; tergite 8 with pores less distant than on 7, and with 2 pairs of micro-bristles behind them; bristles on segment 9 long, b. 1 about 160 μ, b. 2 and 3, 140-148 μ, all pointed; tube

similar to that in *distinguendus*, dorsal length about 180, lateral length 185 μ, width across base 80, at tip 40 μ; the longest (lateral) anal hair, 200 μ.

Formerly I thought this species to be a variety of *distinguendus*, it is however distinguished by the larger eyes, the coloration of the antennae, and the greater number of micro-bristles on the tergites 7 and 8; *H. simplex* Buffa and *marrubiicola* Bagn. have the tube much larger and the postoculars longer; *alpester* Pr. differs in the shape of the head, the smaller eyes, the presence of small spines at the cheeks, and also in the number of micro-bristles on the tergites 7 and 8.

9. Haplothrips tritici Kurdjumov.

Habitat: Palestine, Safed, 16.4., on clover; Mikveh Israel, 29.3., with larvae on *Gramineae;* Rananah, 28.3.33, on wheat; Ramath Gan, 4.4.32, in *Citrus* flower.

10. Haplothrips juncorum Bagnall.

Habitat: Palestine, Tel Mond and Birket Ramadan, 16.8.35 (coll. A. Rabinovitch).

11. Haplothrips atriplicis spec. nov.

It is a common species, discovered by Dr. Bodenheimer and also found by Dr. Rivnay and myself, in the Jordan Valley, Palestine, as an inquiline in galls of *Asphondylia conglomerata* on *Atriplex halimus*, a salt shrub.

Female: Brown to blackish, all bristles clear except the coxals and the base of the anals which are shaded (base of prothoracics may be somewhat shaded in very dark, fresh specimens); joint 1 of the antennae dark, 2 pale yellow but dark at base and towards the middle, marginally, 3-7 pale yellow, 7 at apical margin, and 8 wholly, pale greyish brown; all tarsi pale yellow; fore tibiae pale yellow at least in their distal half, middle and hind tibiae pale yellow at tips; wings colourless.

Head longish, with cheeks slightly converging posteriorly, broadest behind eyes; eyes moderately large; mouth-cone heavy, much narrowed towards apex, and bent upwards, apex narrowly rounded; head length 200 μ and more (208 including projection), width 156 μ (152 μ across base); length of eyes 56-60, cheeks behind them 155 μ; postoculars blunt, about 40 μ, their distance from the eyes 12-16 μ; antennae moderately long, 303 μ; joints (of holotype): 20-22(25-26), 45-48(26), 39-42(24), 46-50(28), 46-48(25), 42-43(22), 39(18), 25(11) μ; the two distal bristles and the areola of joint 2 not so near the apical margin as usual; joint 3 only slightly asymmetrical, with two sense-cones, 4 with four cones, the following joint also as usual; joints 6 and 7 somewhat constricted at base, joint 8 somewhat

narrower than 7 at apex, conical. Pronotum length 112, width 286 (without coxae 260) μ; antero-angular bristles blunt (as all the remaining), well developed, about 32, postero-angulars somewhat shaded, 48-64 μ, interiors 40-48 μ, coxals 36 μ; fore-legs slightly enlarged, width of fore-femora up to 80 μ; fore tarsi with a comparatively stout tooth in their middle, issuing from a broad base. Pterothorax width 260-304 μ; wings distinctly constricted in the middle, basal bristles pale, knobbed, 32-36, 36-40, 60-72 μ; 2 to 6 cilia duplicated, fringe hairs smooth. Tergum of the triangular first abdominal segment rather pale; dorsal pores on tergite 8 far apart, with 2-3 micro-bristles between them; pores on tergite 7 very close (24 μ) to each other with 2 pairs of micro-bristles at their sides (in several cases only 1 pair; anomalities in this respect are common); bristle 1 of segment 9, 84-88, b. 2 and 3, 80-88; tube *very short*, conical, but a basal portion of about 20 μ lateral length not so strongly tapering than the larger remaining part; tube length 90-92 (dorsally) or 94-96 (apically), basal width 56-58, apical width 29-31 μ; the longest (lateral) anals about 105 μ.

Male: Small, mesothorax width 190-225 μ; as the female, but joint 7 of the antennae shaded in distal *half*; double fringe 0 to 5; penis somewhat forked at tip; measurements of allotype in μ: Head length 170 (incl. proj. 176), width 140; eyes 54; postoculars 40, distance from eyes 16; antennae 277-295; joints 20(24), 39-41(22), 36(22), 42-43(23), 42(21), 39(19), 36(16), 22(11); tube (dorsally) 86, basal width 47, apical width 28; b. 1 on segment 9, 80, b. 3, 95-100.

Habitat: Palestine, Gedida (North of Dead Sea), 10.4.32, in galls of *Asphondylia conglomerata* on *Atriplex halimus* (E. Rivnay coll.); near Jericho, at the banks of the Jordan River, 23.1.35, in the same galls (coll. H. Priesner). It is an inquiline, living between the scale-like, small leaves of the gall.

This species, though having a rather heavy head and mouth-cone, is a true *Haplothrips*, and Dr. J. D. Hood who also examined this insect, is of the same opinion; it is easily separated from most of the species of the *aculeatus*-group where it belongs, by the strongly toothed fore tarsi of both sexes, the colour of the antennae and the pale, dilated prothoracic bristles: thus it comes near to *pharao* Pr. and *leptadeniae* Pr.; the former however is a much larger form, having a very short, bluntly rounded mouth-cone, more slender antennae, small tarsal tooth in the female, longer tube and a greater number of double-fringe hairs, a.s.o.; *leptadeniae*, though similar, differs in having the fore femora more greatly enlarged, a larger number of double-fringe cilia, dark prothoracic bristles and only one sense-come on the (more slender) third antennal joint.

12. Haplothrips eragrostidis Pr.

Habitat: Palestine, Kali Roy, on *Suaeda* (coll. E. Rivnay).

13. Haplothrips rivnayi spec. nov.

Closely allied to both, *H. strigae* Pr. and *H. gowdeyi* (Frkl.) but the postocular bristles are finer, pointed or nearly so, and the insect is smaller than *strigae*; in the length of the bristles it much more approaches this species than *gowdeyi* with which it agrees in having the mouth-cone short, whilst in *strigae* it is long and resembling that of *Neoheegeria;* joints 3-6 of the antennae are pale yellow without shading; at first sight, it resembles *H. cahirensis* (Tryb.) or *subtilissimus* (Hal.), but the short joint 3 and the two sense-cones of it, together with the armed fore-tarsi render it easily distinguishable from all the members of this section.

Female: Black or blackish brown with crimson mesodermal pigmentation, legs dark, fore tibiae clear yellowish, shaded at extreme base and much at margins, fore tarsi clear yellow; middle and hind tarsi yellow, more or less intensively shaded with grey; joints 1 and 2 of the antennae quite dark, 3-6(-7) clear pale yellow, 7 and 8 pale brown to brown, 7 sometimes half or wholly yellowish; wings clear, basal plate but slightly shaded; cephalic and prothoracic bristles dark, as in *gowdeyi*, the basal wing bristles and those on the terminal abdominal segments (6-9) light; the long dorsi-lateral bristle on the tergites 1-5 dark; anals dark at base.

Head normal, length 180(192), in large specimens 188(204) μ, width 180-184 in well mounted specimens; eyes 76-84, cheeks behind them 104-124 μ; postoculars 68 μ, their distance from the eyes 12 μ; mouth-cone short, not very broad, about as in *gowdeyi;* antennae length 294-346 μ; measurements of joints: 22(b. 31, t. 25), 45(25), 39(28), 43-46(29), 43-45(25), 36-39(22), 34-35(18), 22(11) μ; joint 3 thin at base, much widened towards apex, nearly symmetrical, about as in *gowdeyi*, with two well developed sense-cones, 4 with four sense-cones, broad, 8 much narrower at base than 7 at apex but not constricted. Pronotum length 140 μ, antero-angular bristles 48-50 μ, interior antero-marginals 44 μ, both pairs of postero-angulars 72-84 μ, all blunt, dark, with white knob; fore femora rather stout, fore tarsi with a small tooth. Pterothorax width 345-398 μ; wings (length 690-795) rather narrow, constriction distinct, fringe hairs smooth, 8-10 cilia duplicated; basal wing bristles pale, knobbed, 50-60, 52-60, and 80-88 μ, b. 3 much longer than 1 or 2. Tergite 8 of the abdomen with 2 pairs of micro-bristles between the discal pores, on a somewhat higher plane than the latter; tergite 7 with 1-2 pairs at the sides of the pores (which are 25-28 μ distant); b. 1, 2 on segment 9 100-104 μ (116-120 in the paratype), practically pointed; tube length (dorsally) 102-108 (in some cases up to 120) μ or (laterally)

108-120 μ; width across base 62-64, at apex 30-34 μ; the longest anal hairs 132-140 μ; hind tibiae 174-190 μ.

Male (oedymerous and gynaecoid): Coloration as in the female, fore tibiae only slightly shaded at margins, all tarsi yellowish in the unique specimen; joint 6 of the antennae may be shaded apically, in dark specimens; head length 170(180), width 164, eyes length 76, postoculars 60-65 μ, nearly pointed; pronotum length 128 μ; antero-angular bristles 44, postero-angulars 60 μ; antennae length 285 μ; joints 2-8: 39-42(25), 36(23), 42-45(25), 43(21), 36-38(21), 32-34(17), 24(10) μ. Pterothorax width about 277 μ; double-fringe 6; basal wing bristles 40, 44, 60 μ, 1 and 2 knobbed, 3 almost pointed. Bristles on segment 9 pointed, b. 1 104, b. 2 spine-like, b. 3, 120 μ; tube (dorsally) 102 μ, basal width 52, apical width 29 μ.

Habitat: Palestine, Kirjat Anawim, 1.-15.9.30, on *Daucus carota* (coll. Bodenheimer, AK XIX/39 & AK XX/19); Jerusalem, 1.7.30 (Bodenheimer, AJ XV/107); Estuary of Arnon, eastern shore of Dead Sea, 14.4.32, on *Chrysanthemum* and *Matricaria* (E. Rivnay coll.); Transjordania, Mizraa, 13.4.32, *Cruciferae* (E. Rivnay coll.).

14. Haplothrips gowdeyi (Franklin).

Habitat: Palestine, 2.-4., Ramath Gan, Dileb, Petach Tikvah, Tel Or, in flowers of *Citrus*, *Senecio* and *Sinapis* (E. Rivnay coll.)

15. Haplothrips cypriotes Pr.

Habitat: Palestine, Hedera, 1932, on *Citrus* (E. Rivnay).

16. Haplothrips rabinovitchi spec. nov.

Belonging to the *subtilissimus*-group; differing from *cypriotes* by the smaller size — on an average —, the perfectly colourless wings, the light basal wing and abdominal bristles, whereas the postoculars and prothoracics are as dark as in *cypriotes;* however, all basal wing bristles are knobbed, as in *minutus* (Uz.); the colour of the tibiae is the same as in *cypriotes*, except the fore tibiae which are almost entirely clear yellow in the new species; *minutus* has no sense-cone on joint 3, and has the basal wing bristles shaded; its postoculars are longer and the tibiae yellow to a greater extent than in the new species; *longipes* Bagn., is a much stouter form, and it also differs in the colour of the legs; the yellow part of the middle and hind tibiae is much larger than in *andresi*, about as in *cypriotes*, and less than in *flavitibia* Will., *longipes* Bagn. or *minutus* Uz.; in *phyllireae* Bagn., the middle and hind tibiae are yellow in their apical 4th and 5th, and the abdominal bristles are strong, dark and conspicuous; it is a much larger species than *rabinovitchi*,

Female: Grey brown to dark brown with very rich red pigmentation; joint 1 and 2 of the antennae as dark as the head, 2 yellowish at apex, 3-6 lemon yellow, 6 sometimes faintly shaded at apex, 7 and 8 pale greyish brown, 7 lighter to clear yellow at base; fore tibiae entirely pale lemon yellow except outer margin at *extreme* base, middle tibiae dark in basal half, abruptly pale yellow in distal half; hind tibiae dark, abruptly pale yellow in apical two fifths; plate of all tarsi blackish; wings clear, somewhat shaded at extreme base; bristles on head and prothorax entirely, anal bristles basally, dark, all other bristles clear.

Head length (from eyes) 172-192, (totally) 180-202, width 168-176 μ; eyes length 76 μ, cheeks behind them 125 μ; postoculars dark, blunt with white tip, well developed, 44-48 μ, distance from the eyes 12 μ; mouth-cone narrow, rounded at tip; antennae length 303-320 μ; measurements of joints, ? (b. 29, t. 24), 44-46(25), 44-48(22), 52-54(28), 46-48(32-34), 44(21), 36-38(18), 23-24(11) μ; joint 3 with one, the exterior sense-cone, 4 with four cones. Pronotum length 112-120 μ; antero-angular bristles blunt at tip, 35-40 μ, postero-angulars 56 μ, interior pair 40-45 μ, all dark, blunt at tip; fore tarsi unarmed. Pterothorax width 310-330 μ; basal wing bristles 44-48, 44-48, and 76-84 μ, all knobbed; fringe not plumose, smooth; 8-12 cilia duplicated. Pores and micro-bristles on the tergites 7 and 8 as in *H. cahirensis* Tryb. or *subtilissimus* Hal.: pores on 8 far apart, 1 pair of micro-bristles within, on the same plane; on 7, pores very close to each other, micro-bristles behind, but three times as much distant as the pores from each other. Bristles on segment 9 clear, b.1, 76-80, b.2, 84-88 μ, the former not quite as fine and sharp as the latter; anal hairs 120 μ. Tube length 92-96 (dorsally) or 100-105 μ (laterally), width across base 54-56, at tip 32 μ.

Male: Colour exactly as in the female; double fringe 6-8; b.1 on segment 9, 80, b.2, 28, b.3, 84 μ; tube (dorsally) 84, (laterally) 88 μ, basal breadth 45, apical br. 27 μ. Head length 160 (total 168), breadth 146 μ; antennae, joints 2-8: 42(21), 42(19), 48(22-23), 43(21), 43(18), 38(15), 22(10) μ. Pronotum length 92 μ, postero-angulars 36-40 μ, interiors 28 μ. Fore tarsus with a distinct small tooth arising from base of tarsus.

Habitat: Palestine, Tel Mond & Birket Ramadan, 16.8.35, swept (A. Rabinovitch).

Several females and 1 male of this species were taken by Mr. A. Rabinovitch to whom we owe the discovery of a series of very interesting and some new species of Thysanoptera of Egypt and Palestine.

17. Haplothrips andresi Pr.

Habitat: Palestine, Zichron Yakouv, 27.3.32, on *Scabiosa* (E. Rivnay

coll.). I suppose that this species will be found more abundantly near the sea on the costal plane between Zichron and Benjamina, on the dunes covered with *Thymelaea hirsuta*, which I saw when passing this region by train.

18. Haplothrips eothripinus spec. nov.

A small species having head, antennae, wings and tube comparatively short.

Female: Dark brown, fore tibiae yellow towards tip, margins darker than the rest; fore tarsi pale yellow, middle and hind tarsi greyish, tibiae not lighter at tips; bristles clear, those at apex of tube shaded at base; wings clear throughout. Antennae: joints 1 and 2 as the head, 3 and 4 pale yellow, 5 yellow but very slightly tinged with grey about the distal half or third, 6 pale yellow at base only, distal portion pale grey, 7 and 8 grey, paler than 1 or 2.

Head length (from eyes) 156-162 or (totally) 175 μ, width 185 μ, cheeks distinctly arched; eyes length laterally 76 μ, cheeks behind them 105 μ; postocular bristles *very small*, not over 20 μ (ab. 16 μ), 16-18 μ distant from hind margin of eyes; mouth-cone short, broadly rounded; antennae length 250-260 μ; joints very short, as follows: 20(28), 44(27), 36(27-28), 36(28-29), 36(26), 36(24), 28(20), 20(11-12) μ; joint 2 very short, conical, slightly asymmetrical, with 2 *small*, pointed sense-cones, joint 4 with four, joint 8 very short, conical. Pronotum length 105, width without coxae 242 μ; antero-angular bristles blunt, 24 μ, postero-angulars thick, blunt, 48 μ, interiors well developed, somewhat more slender, 44 μ; fore legs short, fore tarsi unarmed. Pterothorax length 268, width 295 μ; wings length 588 μ, i.e. comparatively short, with a slight constriction well behind the middle; 5 cilia duplicated, fringe not plumose; basal wing bristles of about equal length, 36-40 μ, distance 16-18, and 12 μ, respectively. Tergite 8 with two pairs of micro-bristles outside the pores, tergite 7 with 1 pair of micro-bristles in the same position; tube very short, length 80-84 (dorsally) or 90 μ (laterally), width basally 54, apically 31 μ; bristles on segment 9 well developed, b.1, 48-53, b.2, 42-45 μ; the longest (lateral) anals 62-64 μ; wing retaining spines stout.

Habitat: Palestine, Jordan Valley, Allenby bridge, 27.7.35, swept; coll. A. Rabinovitch.

This species represents quite a peculiar type of *Haplothrips*, by its short antennae, the stout, blunt, pale bristles of the prothorax, the small postoculars, and the slight constriction of the short wings; it is certainly a true *Haplothrips*.

Assemblée Générale Ordinaire du 11 Mars 1936

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Rapport du Secrétaire Général (exercice 1935) :

Messieurs,

L'année qui vient de s'écouler a été en grande partie consacrée à l'agencement général de nos différentes sections.

Des efforts tout particuliers ont été déployés pour l'organisation des collections entomologiques. Actuellement près de 100.000 insectes sont étiquetés, nos collections de Coléoptères, Orthoptères et Lépidoptères sont définitivement ordonnées. De plus, il a été créé une collection biologique du plus haut intérêt éducatif.

Un vaste emplacement a été réservé aux collections d'ornithologie dont l'organisation touche à sa fin. Nos collections botaniques sont actuellement conservées dans quatre vitrines appropriées.

Notre Bibliothèque continue à se développer tant par voie d'échanges que par les achats effectués.

L'importance de nos publications a surpassé le niveau des années précédentes. Il a été distribué les Bulletins 1934, fasc. 4, l'année complète 1935, ainsi que les Mémoires Vol. IV, fasc. 2, tous trois abondamment illustrés de clichés et de planches en noir ou en polychromie. Les échanges sont en continuelle progression et donnent à nos publications une diffusion mondiale.

Une recrudescence de visiteurs a été notée. Nous en avons accueillis plus de 1500 et nombreux sont ceux qui ont consulté nos collections et notre bibliothèque ou utilisé nos laboratoires.

Les renseignements techniques et les identifications d'insectes fournis ont été plus nombreux que par le passé.

Notre Salle de Conférences a été régulièrement mise à la disposition des Institutions scientifiques.

Nos délégués ont participé aux travaux du VIème Congrès International d'Entomologie de Madrid et du XIIème Congrès International de Zoologie de Barcelone.

Le nombre de nos membres est légèrement supérieur à celui de l'année précédente.

Le Ministère de l'Agriculture nous a fait parvenir sa subvention annuelle de L.Eg. 500.

Notre situation financière a été sérieusement affectée par les dépenses occasionées par l'extension de notre Siège. De ce fait, le capital de la Société a été entamé de L.Eg. 4500 et nos revenus ont sensiblement diminué. Votre Trésorier vous exposera les détails de sa gestion pour 1935.

Ce rapport sur l'évolution de notre Société démontre la vitalité toujours croissante de notre Institution et l'activité féconde avec laquelle l'Egypte participe au mouvement scientifique contemporain sous l'égide de son Auguste Souverain.

Aux termes de l'Article 13 des Statuts, les membres sortants de votre Conseil cette année sont les suivants: S.E. Mohamed Efflatoun Pacha, Dr. Hamed Seleem Soliman et Monsieur Edgard Chakour. Ils sont rééligibles.

Vous aurez également à élire deux Censeurs.

Signé: A. Alfieri

Rapport du Trésorier:

Situation au 31 Décembre 1935

Doit	L.E.	M.	**Avoir**	L.E.	M.
Compte Bâtiment	14503	285	Compte Subvention du Gouvernement	500	000
» Portefeuille	13766	783	» Vente Publications	19	450
» Cie du Gaz	4	629	» Intérêts	75	599
» Collections	958	280	» Diplômes	0	200
» Frais Généraux	241	494	» Donations	40750	000
» Laboratoire	542	122	» Cotisations	73	949
» Bibliothèque	1809	358	» Divers	1532	380
» Publications	648	114	» Coupons	730	717
» Appointements	852	375			
» National Bank of Egypt.	2349	145			
» Mobilier	7931	710			
» Loyer	1	000			
» Impôts et Assurances	74	000			
	43682	295		43682	295

Inventaire

Actif			**Passif**		
Bâtiment	14503	285	Donations	40750	000
Portefeuille	13766	783	Divers	1115	312
Cie du Gaz	4	629			
Collections	958	280			
Laboratoire	542	122			
Bibliothèque	1809	358			
Mobilier	7931	710			
National Bank of Egypt	2349	145			
	41865	312		41865	312

Le Portefeuille Titres en dépôt à la National Bank of Egypt se décompose comme suit:

157 Obligations Héliopolis 5 %.
9020 £ Dette Unifiée Egyptienne 4 %.
6700 £ Dette Privilégiée Egyptienne 3 ½ %.

Signé: R. Wilkinson.

Rapport des Censeurs:

En conformité du mandat que vous avez bien voulu nous confier, nous avons l'honneur de porter à votre connaissance que nous avons procédé à la vérification du Bilan des Comptes de la Société Royale Entomologique d'Egypte arrêtés au 31 Décembre 1935, qui vous est présenté par votre Conseil d'Administration, ainsi que des pièces y afférentes, dont nous avons reconnu la parfaite concordance avec les écritures de la Société et en indiquant clairement la situation.

Le Caire, le 10 Février 1936.

Signé: Dr. A. Azadian et E. Kaourk.

Décisions:

L'Assemblée Générale approuve les Rapports du Secrétaire Général, du Trésorier et des Censeurs et donne au Conseil décharge de sa gestion pour l'exercice écoulé.

Elections:

Messieurs Edgard Chakour et Dr. Hamed Seleem Soliman, membres du Conseil sortants, sont réelus.

Monsieur Said Bahgat est élu en remplacement de S.E. Mohamed Effiatoun Pacha.

Messieurs le Dr. A. Azadian et E. Kaourk sont réelus aux fonctions de Censeurs des comptes de la Société.

Séance du 1er Avril 1936

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Elections:

Les votes relatifs à la constitution du Bureau du Conseil et du Comité Scientifique pour l'exercice 1936-1937 donnent les résultats ci-dessous:

Sont élus: Monsieur le Professeur Docteur H. Priesner et Monsieur le Professeur H. C. Efflatoun Bey, *Vice-Présidents;* Monsieur Anastase Alfieri, *Secrétaire-Général;* Monsieur Richard Wilkinson, *Trésorier.*

Sont élus membres du Comité Scientifique: Messieurs le Professeur Docteur H. Priesner, Professeur H. C. Efflatoun Bey, Docteur Kamel Mansour et Anastase Alfieri.

Description of a new species of *Phenacoccus* (Coccidae) found in Egypt

(with Text-Figures a-i)

by F. Laing, M.A., B.Sc.

(Entomological Dept., British Museum, Nat. Hist.)

I am indebted to Dr. H. Priesner for the privilege of examining a few species of Coccidae which he had collected in Egypt, and as one of them appears to be an undescribed *Phenacoccus* I have great pleasure in naming it after him. The type is retained in the collection in the British Museum, but para-types have been deposited in the Entomological Section, Ministry of Agriculture, Cairo.

Phenacoccus priesneri, sp. nov.

Adult ♀. — Mounted specimens only available for study, and the external appearance, therefore, unknown. Female elongate-oval, narrow, the length approximately three times the breadth. Antennae 9-segmented, the proportions of the segments as follows: (1) 20, (2) 20, (3) 15, (4) 10, (5) 12.

(6) 11, (7) 14, (8) 12, (9) 20; total length 0.31 mm.; eighth segment with one, ninth with two, one on either side, rather stouter, blunt, subapical setae; segments 8 and 9 semifused, the former varying somewhat in length. Rostrum short, broad, scarcely reaching beyond the fore-coxae. Legs normal, the hind tibia approximately twice the length of the hind tarsus and subequal to the hind femur, but in the case of the other two pairs of legs the tarsus is greater than half the corresponding tibia, the proportions being in the middle pair 60:35, and the front pair 55:35; hind tibia with rather conspicuous translucent pores on the outer side of the posterior two-thirds; denticle on claw so poorly developed that it might be described as absent; both pairs of digitules unexpanded apically; two strong subapical spines on each tarsus. On the upper surface the cuticle with numerous large, unilocular

Phenacoccus priesneri, spec. nov.:

a. antenna; b. cephalic region and c. posterior segments showing the grouped ciriparous pores; d. tibia and tarsus of hind leg; e.-h. the cerarii on the last four abdominal segments, from behind forwards; i. the ocular cerarius.

discoid pores, grouped into clusters, the number of pores in each cluster varying, the smallest from 2-4; there are four cephalic pairs, one pair of about 12 pores lying slightly posterior to the eyes, the other three pairs, of 2-7 pores, situated submedianly one behind the other on either side of the median line; the groups on the thoracic and abdominal segments number

from 8 to 10 on each segment, but especially posteriorly the clusters tend to fuse, while the number of pores on the more anterior segments are fewer than on the posterior; in addition, there are on the dorsal surface numerous smaller, multilocular pores about half the size of the unilocular disc pores found in the clusters; also numerous minute triangular pores. Cerarii present with certainlty only on the posterior five segments and two cephalic pairs, one interantennal pair and an ocular pair, the pores and setae of any cerarii present on the intervening segments merging with those of the body; cerarian spines, when present, two in number, fairly large on the last and penultimate positions but decreasing in size anteriorly; no auxiliary setae. Numerous minute, more or less lanceolate spines scattered over the dorsal area. Ventral surface with large, unilocular discoid pores on the posterior 3-4 segments forming almost continuous transverse series composed of several rows. Length, 1.4 mm.; breadth, 0.54 mm. (average of four specimens).

Giza, on grass, December 1929 (Dr. H. Priesner).

The grouping of the dorsal ciriparous pores into clusters resembles the condition found in the Italian *Pseudococcus cycliger*, Leon., specimens of which I have been unable to examine. Leonardi describes his species as possessing eight-segmented antennae, but the presence of a well developed ungual denticle would indicate that it has affinities with, if it does not actually belong to, the genus *Phenacoccus*. The Egyptian species here described has exactly the opposite set of characters, namely nine-segmented antennae and an ungual denticle so faint as to be almost invisible. The conspicuous lips of the dorsal ostioles are common to both species; in *P. cycliger*, Leonardi's figure suggests that the ciriparous pores in the clusters are multilocular, whereas in the Egyptian species they are unilocular.

On some further new Thysanoptera from the Sudan

(with Text-Figures 1-8)

by Prof. Dr. H. Priesner.

The following descriptions of Thysanoptera deal with a selection of new species collected by Mr. W.P.L. Cameron, Entomologist to the Sudan Government, during his *Thrips* investigations and inspection trips of last years.

A. Terebrantia.

Scolothrips brevipilis spec. nov.

Male: Pale yellowish to pale pinkish, tip of abdomen somewhat orange, sides of mesothorax with grey shadings, fore wings with 2 dark cross-bars; bristles rather pale, those on the dark cross-bars of the fore wings shaded, each bar occuping 70-85 μ. Antennae, joint 1 light, 2 orange, 3 pale greyish, light at base, 4-8 pale grey; legs pale. (The specimen is immature, the antennae therefore somewhat collapsed).

Head length 90, from eyes 76, width 128 μ; eyes length 52 μ; two pairs of long (36-40) anteocellar, one pair of somewhat longer (60-64) interocellar bristles, the latter in the central distance between the front ocellus and the hind ocelli; postoculars very small. Mouth-cone short, maxillary palpi moderately long. Measurements of the antennae: 14-15(24), 28(22), 34-35, 27-28, 25, 34 ?, 7, 8 μ; one long dorsal bristle on joint 2, several (32-34 μ) on joints 3 and 4; sense-cones long and thin. Prothorax length 132, width about 155 μ; the prominent bristles (6 pairs) all about 60 μ in length; tarsi unarmed. Pterothorax width 225 μ at the most; wings not very long, about 520 μ, width at base 60 μ, between the two cross-bars 40-43 μ; costa with about 14-16 long bristles, costal bristle between the cross-bars about 84 μ long; upper vein with 8-9 long bristles, lower vein with 4. No comb on abdominal segment 8, and no accessory bristles on the sternites; tergite 9 with a transversal row of 6 bristles the innermost of which measures about 40 μ; the laterals on segments 9 and 10: 68-76 μ; sternites 3-8 each with a very broad glandular area which is constricted in the middle; measurements of glandular areas: 128(8), 128(8), 128(8), 126(8), 114(10), 102(12) μ. — Total body length (distended): 0.95-0.97 mm.

Habitat: 1 male, Sudan, Khartoum, 24.3.34, on *Thespesia populnea* (W.P.L. Cameron).

Differs from all species of *Scolothrips* by the much shorter bristles, particularly those of the prothorax; from several species it is also distinguished by the dimensions of the cross-bars of the fore wings.

Scirtothrips nubicus spec. nov.

Female: Pale yellow, antennae shaded from joint 2; with dark cross-lines of the segments, attaining the margins on the tergites but not on sternites where there are but 3 transversal lines; wings faintly shaded with grey; bristles on the body distinctly visible, shaded.

There is no need of a more detailed description, because this species comes very near to *Sc. fulleri* Faure; using Faure's key on the South African species of this genus (Transv. Univ. Coll. Agric., Bull. No. 18, 1929, pp. 1-2). as well as after my own table (Bull. Soc. Roy. Ent. d'Egypte, 1932, p. 150), one gets to *fulleri*; the latter species however is distinguished in both sexes with certainty by slight but constant differences; in *nubicus*, the female has 4 bristles on the lower vein (the male 2-4), in *fulleri*, there are always only 1-2 bristles present. The male of *fulleri* (Faure, l.c., fig. 11) shows a transversal row of 4 strong bristles and a second basal row of 2 bristles on segment 9; in *nubicus*, also 2 rows of bristles on this segment, as in *fulleri*, but they are arranged differently.

Head and prothorax almost as in *fulleri;* length of antennae about 208 μ; measurements of antennal joints, as follows: 17(18-20), 34(21), 36(16), 31(14), 36(14), 35(13), 6(6), 7-8(4) μ; joint 3 provided with two ringlets, as usual, joints 4 and 5 with white ringlet (as in *Cricothrips*). Hind margin of the pronotum with four pairs of bristles, the outermost extremly small, the 3rd longest (about 21-22 μ); pronotum with fine, very close cross-lines and very sparse bristles on disk. Length of wings ab. 500 μ; costa with 25-26, upper vein with 3+6 basal and 2(3)+2 distal (or 3+7 basal and 2+3 distal) bristles, lower vein with 4-5 (exceptionally 3) bristles; abdomen densely set with microsetulae, tergites more profusely set with bristles, laterally, than in *Sc. combreti*, about as in *fulleri*, b. 1 of tergite 8 longer (32-34 μ) than the laterals, hind margin with complete comb; b. 1 on segment 9, 44-46 μ, b. 2, 48-52, b. 3, 36 μ, dorsals 30 μ; bristle on segment 10 about 48 μ, bristles on the legs as in *fulleri*. Mesothorax width 174-190 μ. Head width about 120 μ.

Male: Measurements of antennal joints; from 4th: 29, 32, 34, 6, 7 μ. Sickle bristle as in *fulleri*, simply bent inward.

Habitat: Sudan, Hag Abdulla, 20.1.1930, on leaves of *Acacia nubica* (W.P.L. Cameron, No. 158).

Frankliniella dampfi Pr. f. nana nov.

Frankliniella dampfi Pr., originally described from Egypt (Entomol. Mitteilg., XII, 1, p. 64, fig. 4, 1921), is one of the most abundant Thripidae of Egypt and the Sudan, occurring in all sorts of flowers, and it is also a minor pest of cotton ; I have seen the same species from India (Coimbatore, on *Crotalaria*, *Datura*, *Lantana*, coll. Y.R. Rao & R. Ayyar), and it is possibly identical with *Frankliniella sulphurea* Schmutz of which I have no type specimens at hand at the moment.

Cameron's Sudan material contained a particularly small form of this species which might erroneously be considered as a particular species ; this form is connected with the typical *Fr. dampfi* by continuous transgressions, and is only distinguished by the much smaller size and therefore shorter antennae and bristles, furthermore, by the lesser number of lower vein bristles.

Colour as in *dampfi*. Measurements of antennal joints, from joint 4 : 36-39(15-19), 29-31(15-17), 39-42(14-15), 8(6), 14(4) μ. The interior posteroangulars of the prothorax 52-56 μ, the others 44-50 μ, the interior anteroangulars 34, bristles at base of metathorax 48 μ ; b. 2 of segment 9, 84-94 μ. Lower vein with 10-12 bristles. Antennae somewhat more strongly shaded than in the typical form or exactly as in this form ; in the darkest specimens, joint 4 is pale only at base, joint 5 pale in basal half.

This form is to be found along with the typical *dampfi*, in flowers ; the type is from Kom Ombo, Egypt, 6.3.31, on *Sesbania aegyptiaca*, H. Priesner coll. ; further specimens and transgressive forms from Wad Medani, Sudan, 9.5.28 from cotton, and 28.3.32, bred on buds of cotton (W.P.L. Cameron) ; at the same locality, also in flowers of *Dolichos lablab*, L.

Perissothrips Hood
(Subgenus Bdalsidothrips nov.)

The structure of the prothorax, the wings and the abdomen as in *Perissothrips*, s. str., but the fore tibiae of both sexes are not produced into a tooth or a distinct angle, and the tergites of the abdomen of the male are simple, i.e. without a comb of toothlets. Rostrum somewhat shorter.

Type subgen. : *Perissothrips* (*Bdalsidothrips*) *levis* spec. nov.

Perissothrips (Bdalsidothrips) levis spec. nov.

Female : Pale yellow, the extreme tips of the mouth-cone and the abdomen, somewhat shaded with brown, the terminal tarsal plate as well ; the ocelli are very probably pigmented with orange or crimson in fresh specimens ; antennae with joints 1, 2 and 3 pale yellow, joints 4, 5 and 6 yellow at base, shaded with brown in apical half (or more), 7 and 8 dark. Wings

slightly shaded with yellow; bristles but slightly darkened, partly wholly pale.

Head short and small but nevertheless somewhat longer than in both, *Perissothrips parviceps* Hood and *Perissothrips halli* Faure, length about 48 μ from fore margin of the eyes, width 100 μ; length of eyes 44 μ; cephalic bristles vestigial; head length including mouth-cone 180-188 μ, mouth-cone beak-shaped but scarcely surpassing the base of the prosternum, and also the maxillary palpi shorter than usual, 52 μ, joint 1-3, 22, 11-13, and 20, resp. Antennae length about 208 μ; lengths (breadths) of joints: 17-20(21). 31(21), 32(16), 31(17), 31(15), 36(13), 8(6), 14(4) μ; joint 2 comparatively long, joint 3 and 4 with very thin, long, strongly curved, forked sense-cones, joints 5 and 6 spindle-shaped, 6 more slender than 5, style slender. Prothorax large, length 140, width about 145 μ, dilated towards base; disk sparingly set with small bristles, hind margin with a transversal row of 6 pairs of transversally appressed small bristles which are directed inward, and 1 postero-angular pair, far down as in *P. parviceps*, and measuring about 28 μ. Pterothorax width 182 μ; length of wings 0.554 mm., width across base 52-56 μ, about the middle 29 μ; bristles very tender, somewhat finer than in *P. parviceps*, and much tinier than in *Mycterothrips*; veins indistinct; costa with about 23 bristles which are however counted with difficulty towards tip of wing; upper vein with 3(4)+3 basal, and 2+1 distal bristles; lower vein with 4 bristles; scale with 5 small bristles the terminal of which is longest (32 μ). Fore legs enlarged, fore tibiae with 1 larger and one smaller bristle apically within, *without tooth or projection*. Abdomen slender, pointed apically as in some *Oxythrips* species, tergite 10 split above almost up to the base, tergite 8 without comb; sternites without accessory bristles; bristles on segment 9, dorsals small, posteromarginals 64-72, stout, pale, b. 1 of segment 10 80-85; ovipositor length 205 μ. — Total body length (normally distended): 0.9-0.92 mm.

Male: Pale yellow, joints 4-8 of the antennae brown, excepting extreme bases (stalks) of joints 4-6 which are yellowish. Length of antennae 200 μ; measurements of joints: 14-17(20), 28-31(18), 31(15), 29-31(16), 28(14), 34(12), 7-8(5), 11-13(4) μ; sense-cone on joint 6 very long. Head breadth about 96 μ, length 52-56 μ; prothorax length 128 μ; fore tibiae as in the female, without tooth; hind angle bristle of prothorax 30 μ; width of pterothorax 155-182 μ.; length of wings 0.5-0.51 mm.; vein bristles as in the female; hind margins of the abdominal segments simple; no conspicuous bristle on dorsum of tergite 9, a fine lateral bristle about 52-56 μ; segment 10 with a long lateral bristle, 112-120 μ; glandular areas wanting.

Habitat: Sudan, Galaa-el-Nakhl, Kassala Province, X.1930, in flowers of *Abutilon* sp., Abdel Rahman Eff. Dafaalla coll. (W.P.L. Cameron No. 227).

This is a small and slender form, differing from both, *Perissothrips*

parviceps Hood and *P. halli* Faure by the subgeneric characters indicated above; in the male sex, it can never be confused with the old species because of its simple abdomen; it is close to *Salpingothrips* but not to *Mycterothrips* the members of which have broad, normal wings, with normally sized bristles.

Mycterothrips fuscus spec. nov.

Female: A pale specimen of an originally *dark-coloured species*, with particularly dark posterior occipital margin and dark fore margins of the tergites 2-8 and sternites 2-7; bristles shaded; antennae with joints 1 and 2 originally certainly dark, 2 somewhat lighter towards apex, 3 pale yellow, 4 and 5 yellow at base, but shaded about apical half, 6-8 dark. Femora shaded, fore femora pale yellow apically, middle and hind tibiae dark, yellow at tips, fore tibiae light, all tarsi light. Wings more or less strongly, distinctly shaded, broadly colourless beyond base.

Head transverse, length ab. 84 μ; interocellars long, 44-48 μ, vertex with almost regular cross-wrinkles; there is a postocular transversal row of very small bristles; mouth-cone long, slender, strongly pointed, maxillary palpi long and fine (25-26 (7), 15-17(4), 20-22(3)). Measurements of antennal joints: 25(25), 34(23), 39-42 (22), 48-50 (20-22), 34-35(16), 48(17-18), 10(6), 15-17(5) μ; joint 3 comparatively short and convex, with stout, strongly bent, forked sense-cone, 4 with even stouter cone (length ab. 34 μ) which is inserted but little beyond middle, i.e. comparatively far basad, lower surface of joint 4 somewhat concave from the middle towards apex, joint 5 distinctly rounded laterally, also from middle to apex distinctly tapering; joint 8 much longer than 7. Prothorax long, 140 μ, widened towards base, bristles on anterior margin vestigial, those on hind angles well developed, two pairs, the inner of which having a length of 56-60 μ, the outer 48-50 μ; the interior hind marginals small, the innermost 24-28 μ. Pterothorax not reticulated above, bristles at base of metanotum 44-46 μ, another pair, laterally, 24 μ; wings moderately (588 μ) long, width about middle 40 μ; both veins conspicuous, bristles well developed, costa with 23-25, upper vein with 3+4+4(5) basal, and 2 distal, lower vein with 11-12 bristles. Tarsi very slender. Sternites of the abdomen without accessory bristles, pleurites with 4-5 distinct teeth at their hind margins; tergite 8 has no comb. Bristles on segment 9, dorsals 40 μ, hind marginals, b. 1, 92-94, b. 2, 88 μ; B. 1, 2 of segment 10, 88-93 μ; segment 10 split above not quite up to the base. Ovipositor length 220 μ; fore tibiae 112 μ.

Habitat: Sudan, Tayiba, Blue Nile Province, 17.10.1927, on leaves and flower buds of cotton, W.P.L. Cameron (No. 93) coll.

The large number of basal bristles of the anterior vein of the fore wings

easily distinguish this species from *M. longirostrum* (J.) which has no prominent bristles on the head; *M. laticauda* Tr., a pale yellow species having the two basal joints of the antennae whitish, is a much smaller insect, and has 8 basal and 2 distal upper vein bristles; *M. flavens* Mlt., *echii* Pr. and *acaciae* Pr., are also yellow species, all having a lesser number of basal wing bristles and much shorter pronotals; *acaciae* has the mouth-cone very long, and has *accessory bristles on the sternites.*

Sorghothrips gen. nov.

Body slender, head longish, somewhat triangular in front (cf. *Plesiothrips*, *Trichromothrips*); antennae of the female 7-segmented with joints 5 and 6 almost cylindrical, 7 long, about as long as 5; long and erect bristles on joints 4-7; sense-cones on 3 and 4 forked; interocellar and postocular bristles well developed; mouth-cone short to normal, maxillary palpi 2-segmented. Prothorax with two pairs of bristles about hind angles, the outer of which a little shorter than the inner. Wings narrow, normal, costa with fringe, besides, with long, fine costal bristles. Legs slender, simple. Abdomen with long terminal bristles. Ovipositor normal. — Male: Antennae much as in *Rhopalandrothrips*, 6-jointed (style wanting), with joint 5 very small, transverse, joint 6 cylindrical, rodshaped, with numerous whirls of long erected hairs. — Larva 2nd stage, with the two terminal joints of the antennae black, joint 6 (last) very long.

Type gen.: *Sorghothrips longistylus* (Trybom) (=*Thrips longistylus* Trybom = ? *Bregmatothrips saccharicola* Bagn.).

This genus is related to *Plesiothrips* and *Rhopalandrothrips*; it differs however by the maxillary palpi which are 2-jointed in both sexes and in the different shape of the female-antenna.

Sorghothrips longistylus (Trybom).
(Figs. 1 and 2)

1911. *Thrips longistylus* Trybom, Results Swed. Exped. Egypt & White Nile, pt. IV. — Uppsala, p. 8, figs. 4-6.

Female: Head, thorax and the four terminal abdominal segments more or less dark brown, head and abdomen darkest, the anterior abdominal segments yellow or slightly shaded, particularly towards apex of abdomen; in some cases the whole abdomen is dark. Dark brown are the antennal joints 1, 2, 6 and 7; 5 is shaded in apical half or 2/3. Legs yellow, with femora shaded at least at the outer margins but sometimes also the outer margins of the tibiae infuscated. Wings pale about the basal fourth, distinctly shaded at second fourth, from there the darkening gradually fading out towards tip. Bristles from yellowish to brownish. Red pigment missing in the specimens at hand which has been in alcohol for some years.

Head longish, somewhat triangular in front, with a slight constriction behind the eyes, and slightly convex genae. Head length 160 μ (132 up to fore margin of eyes), width across eyes 144 μ, across cheeks 142 μ; distance of hind ocelli about 32 μ; interocellar bristles long (48-52 μ), fine, situated on a line connecting the front ocellus with each one of the hind ocelli, and closer to the latter than to the former; two pairs of short anteocellars, one

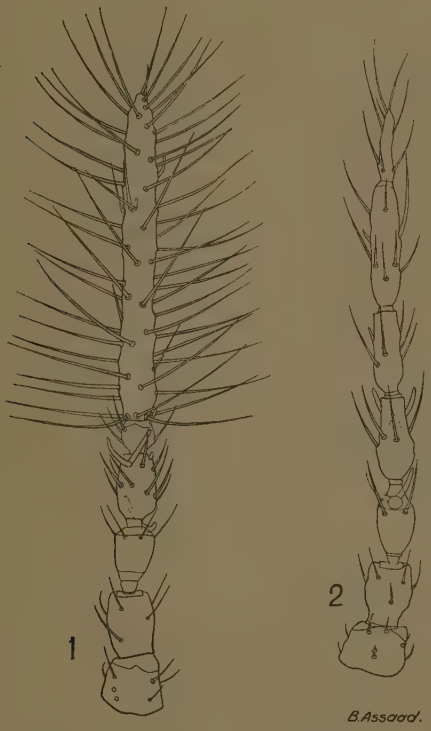

Fig. 1. — *Sorghothrips longistylus* (Trybom) : antenna of male.
Fig. 2. — *Sorghothrips longistylus* (Trybom) : antenna of female.

of them in front of ocellus 1; postocular bristles well developed, i.e. b. 3 (from longitudinal median line) about as long as the interocellars, the other postoculars small, all of them forming an arch behind the eyes; mouth-cone normal, maxillary palpi 2-jointed; antennae slender, length about 310 μ; measurements of joints: 28(36, t. 28), 36(25-27), 36-39(22-23), 45-52 (22-23), 42-45(14-15), 64(17-18), 39-42(8-9) μ; joint 1 broad, somewhat narrowed apically, 2 normal, 3 comparatively very short, with long bristles

(40 μ), and fairly long forked sense-cones, 4 without stalk, broader across basal third, narrowed towards apex, 5 long and slender, cylindrical, 6 longest, 7 broadest about basal fifth, slightly narrowed towards base and apex. Bristles on joints 4-7 long (ab. 36-40). Prothorax length 606-727 μ, not so much broader than long as usual, fore margin with 4-6 pairs of very small bristles; also the mid-laterals rather short, discals few, scattered; posterior angulars 64-68 μ, and 48-52 μ (exteriors), 4 pairs of small hind marginals of about equal length. Pterothorax width 190-225 μ; wings narrow, length about 0.882 mm., width (across tip of scale) 60 μ; costa with about 22 hair-like bristles which are short near base but long towards apex of wing; upper vein with 4(3)+8(7)+1(or 0), sometimes 3(4)+6(5) basal, and 1+1 distal bristles; lower vein with 12-15 bristles; legs slender, simple, hind tibiae with a row of stout inner marginals. No microsetulae on abdomen, and no accessory bristles on the sternites; tergite 8 combless; bristle on tergite 9, dorsals 44-52, hind marginals very long, 164-176, 200, 192 μ. Ovipositor normal, length ab. 260 μ; bristles on segment 10, 190 μ; segment 10 split above but not quite completely. — Total body length (much distended): 1.47-1.56 mm.

Male: Similar in coloration but much more slender, and the antennae quite different, having joint 4 much shorter than in the female, and ovoid, 5 similar, but 6 very long, rod-shaped as in *Rhopalandrothrips consociatus* (T.-T.), bearing extremely long (ab. 64-68 μ) bristles, which are inserted almost vertically; apart from these, there are a few nearly attached bristles to be seen. Joint 7 wanting. Measurements of the antennae: total 346 μ; joints, 31(b. 36, t. 28), 38(27), 36-38(22), 38-39(22), 15(20), 182(19) μ. Postoculars and interocellars in the male about 32 μ; prothoracics 60-64 μ, and 48 μ (int.), on the hind margin within, there are only 2 pairs of bristles. Wings length ab. 0.69 mm.; bristles on upper vein (in the single specimen) as in the female, lower vein with 11 bristles; glandular areas present but on sternites 3 and 4, i.e. in the shape of a crescent of 35 μ by 22 μ; no spines on tergite 9, short bristles on or near hind margin of this tergite but none on disk; the longest laterals 172-180 μ. The general colour of the body of the single male is about the same as that of a dark female.

Larva.

Second stage: Almost colourless, with joints 5 and 6 of the antennae black; the general colour may be yellowish or orange in life; terminal abdominal segment pale greyish; body elongated, head fairly large, width across eyes 100 μ, interantennal distance 16 μ; one bristle in front of eyes 17, two bristles on each side at inner margins of eyes 28 and 14 μ, respectively; bristles of second (postocular) row 17-20 and 11 μ, respectively; antennae

length 188 μ; measurements of joints: 17(28), 28(22), 39(24), 42-45(25), 17(13-14), 34(8) μ; joint 3 very thin at base, much dilated towards apex, joints 5 and 6 strongly chitinized, the latter very long and slender, both with long, colourless hairs. Bristles at fore margin of pronotum, the interior pair 17-20 μ, the exterior 14-15 μ; b. 5 (of posterior angulars) 42-45, b. 6,36μ, all pointed, fine. Cuticle of the abdomen without distinct rows of wartlets or humplets but with indications of such, appearing indistinct and extremely flattened; no microsetulae; bristles on segment 8, b. 1, 2, 40-45, b. 3 longer, 60-68 μ; segment 9, b. 1 about 44-48, *b. 2 very long, at least 108 but may be up to 120* μ; b. 1 on segment 10 about 68-72 μ; all these bristles fine, the longer curved; comb at apical margin of tergite 9 vestigial. Distended specimens measure about 1.29 mm.

The abruptly dark apical joints of the antennae remind of *Anaphothrips*, the other characters however are more as in *Thrips* or *Taeniothrips*.

Thrips leucadophilus spec. nov.

Female: Pale yellow, excepting the tip of the mouth-cone; prominent bristles dark; antennal joint 1 and 2 pale, joint 3 slightly shaded in apical third or wholly yellow, 4 shaded about the apical half, 5 as 4 or more extensively darkened, in this case pale at base only, 6 and 7 dark, 6 paler at base or very indistinctly so; ocelli orange in fresh specimens, in those at hand, however, the pigment has faded out. Wings light or but slightly shaded with yellow.

Width of head across eyes in well preserved specimens about 122 μ, with interocellar bristles moderately long, and situated normally, and with the usual series of small postoculars, the innermost of which (postocellarly situated) about 20 μ in length. Antennae, total length 225-240 μ; joints from 2nd: 34-36, 41-42(17), 36-38(17), 34(17), 42(15), 14-15 μ; sense-cones of moderate length; joint 5 distinctly constricted also apically. Mouth-cone normal, maxillary palpi very slender, their joints fine (17, 11, 20 μ), width of terminal joint 2-3 μ. Costa of fore wings with 19-21, upper vein with 4+3 basal, and 1+1+1 distal, lower vein with 9-11 bristles; wing bristles comparatively long and stout. Legs slender. Abdomen elongate; sternites without accessory bristles, tergite 8 with comb well developed about as in *T. tabaci*; bristles on tergite 9, dorsals 36-40, hind marginals, b.1, 72-80, b. 2, 96, b. 3, 80-94 μ; b. 2 of segment 10, 72-80 μ, b. 1, 76-84 μ; segment 10 split above towards base beyond insertion of bristles; ovipositor length 174-190 μ.

Male: unknown.

I was able to examine several specimens of this species which show that it is related, and might be confused with *T. tabaci* Lind., *T. microchaetus* Ka., *T. canariensis* Pr. or *T. tenellus* Tryb.. The latter species (from

Natal), unknown to me, is quite different from *leucadophilus*, having 15 lower vein bristles, dark joint 5 of the antennae, and darkenings on the tergites as has *tabaci*, but pale body bristles; *T. tabaci* has, in its palest specimens (summer generations), indications of those dark transversal lines on the tergites, and much shorter prothoracic bristles, different shape of the antennae, regularly 4 distals on upper vein, a.s.o.; *microchaetus* is a somewhat larger species with longer antennae, but *much* shorter prothoracic bristles; *canariensis* has accessory bristles of the sternites.

Habitat: Sudan, Ghubshan, 5.11.1931, in buds of *Leucas nubica*, Benth., coll. W.P.L. Cameron, n. 356.

B. Tubulifera

Haplothrips leptadeniae spec. nov.

(Figs. 3 and 4)

Female: Blackish brown to black, fore tibiae pale yellow excepting extreme base which is shaded, middle and hind tibiae dark, *pale yellow at extreme tips;* all tarsi pale yellow. Antennae with joint 1 and basal half (or exteriorly more) of joint 2 dark, the remainder of 2, and joints 3-6 pale yellow, as well as basal half of 7; apical half of 7 and the whole joint 8 more or less faintly shaded. The bristles of head and thorax shaded, those of the abdomen light. Wings colourless. Whether red or orange mesodermal pigment is present in fresh specimens, can no more be ascertained from the specimens at hand in which it has entirely disappeared.

Head length 190-200 (incl. interantennal projection 208), width 174-190 μ; length of eyes (lat.) 72-76 μ, length of cheeks behind eyes 140-145 μ; postoculars 10-12 μ distant from eyes, distinctly knobbed, 48-50 μ; front ocellus situated on the hight of the interantennal projection; mouth-cone short, narrowly rounded; antennae length 329-346 μ; joints, ? (b. 34, t. 25), 49(28-29), 48(23), 56-59(28), 50(25), 45(22), 39(18), 25-27(11) μ; the intermediate joints elongate, 3 only slightly asymmetrical, not quite twice as long as broad, with but 1 sense-cone, 4 with four, the following joints with sense-cones as usual; joint 8 short, broadly attached to joint 7, evenly conical; joint 1 narrowed towards apex. Prothorax length 144, width including coxae 337 μ; anterior angular bristles well developed, 32-40 μ, knobbed, shaded as the others, posterior angulars comparatively short, knobbed, 48-50 and 60 μ, the coxals 40 μ; fore femora *distinctly enlarged*, width 105 μ, fore tibiae stout, fore tarsi with stout tooth which is broad at base, and pale yellow. Mesothorax width 295-346 μ; wings rather narrow beyond middle, little widened towards apex; fringe not pinnate, number of double fringe hairs 8-11; basal wing bristles knobbed, 40-44, 40-44 and 64 μ in length. Bristles on segment 9 of the abdomen moderately long, pale, b.1 72-76, somewhat blunt, as b.2, 60-65 μ, b.3 almost pointed, 80-88 μ;

tube *very short*, conical, measuring (dorsally) 84-92 μ or (ventrally) 100 μ, width across base 60, at tip 34 μ.

Male: Smaller, otherwise as the female. Double fringe 7-10. Measurements in μ: head 180 (or incl. interant. proj., 190), width 180; eyes 76-80; cheeks behind eyes 112-116; postoculars 40; width of fore femora 100; antennae length 303-311; lengths (breadth) of joints, 28 (b. 31, t. 24),

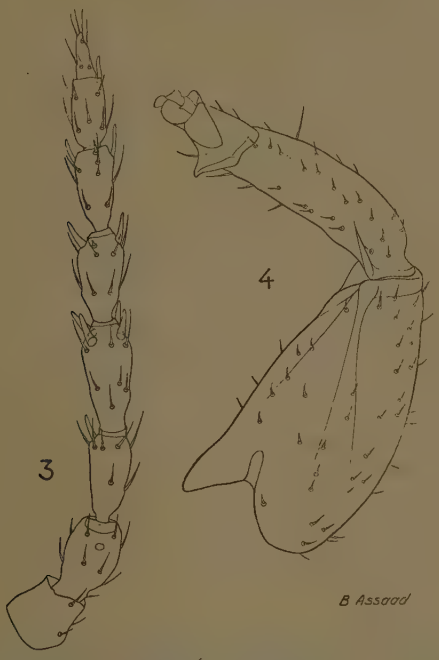

Fig. 3. — *Haplothrips leptadeniae*, spec. nov.: antenna of female.
Fig. 4. — *Haplothrips leptadeniae*, spec. nov.: fore-leg of female.

42(25), 42-43(22), 48(27), 46(25), 43(18), 38(17), 24(11). Prothorax, anterior angular bristles 27, posterior angulars 32 (int.), 40 (ext.). Pterothorax width 260-295. B.1 on segment 9, 76-80, blunt, b.2 spine-like, 36-38, b.3 pointed, 104 (longer than tube); terminals 105; tube length 90 (dorsally), 96 (laterally), width at base 56, at tip 28.—Middle part of penis constricted before apex, so that an apical club-shaped enlarged part is separated from the remainder.

Habitat: Sudan, Bara (North Kordofan), 20.9.1927, in flowers of the common desert shrub *Leptadenia spartium* Wigh. (W.P.L. Cameron, No. 84).

There is no *Haplothrips* known, neither of the African nor the Indian

Fauna having decidedly enlarged fore legs and broadly triangular tarsal tooth *in both sexes*, combined with the small size of this species. Comparing with those forms which have bristles on segment 9 as long as, or longer than, the tube (40(55), p. 233 of my key in Bull. Soc. Roy. Ent. d'Eg., 1930), there is *H. cahirensis* with one sense cone on 3rd antennal, which as *H. sorghi* Bagn. has no tarsal tooth in the female; *H. cooperi* Mlt. has a much longer tube, dark middle and hind tibiae, transparent bristles of which the posterior angulars of the pronotum are somewhat longer; *H. pharao* is entirely different having head of other size and proportions.

Haplothrips (Chiraplothrips) faureanus Pr.

New locality: Sudan, Managil, Blue Nile Prov., 16.1.1930, in large numbers at roots of *Cymbopogon proximus* Stapf. (J. B. Johnston coll.; W.P.L. Cameron, No. 145); Sudan, Wad Shair, 21.3.29, on *Cymbopogon nervatus* Chiov. («Naal grass») (W.P.L. Cameron, No. 129).

Known from Cyprus and South Africa.

Haplothrips (Chiraplothrips) faureanus var. sudanensis nov.

This form may also be specifically different from *H. faureanus;* it is so similar to it that I have been unable to find any other difference than the shape of the head, being constant in a large series of specimens. In *H. faureanus*, the length (width) of the head (including interantennal projection) is 208-230(156-174), i.e. about 1,3 times as long as broad, with cheeks nearly parallel, whereas in the form *sudanensis* the same measurements are 202-216(173-185) in the female, and 200(162) in the male; double fringe 7-11.

Habitat: Sudan, Saoleil, Blue Nile, Fung Province, 3.3.1930, in numbers under bark of *Sterculia ? cinerea* (W.P.L. Cameron, No. 85); Sudan, Tob-el-Ahmar, River Rahad, near M. Bartawi, 16.3.1930, under bark of *Ficus sycomorus* (W.P.L. Cameron, No. 83).

Haplothrips caespitis spec. nov.

Female: The colouration of the body must have been about the same as in *H. pharao* to which this new species is most closely related; the specimens are somewhat pale from preservation in alcohol; body brown, originally very likely with orange pigmentation; middle and hind tibiae wholly dark, (in *pharao* are the tips of them abruptly pale yellow), fore tibiae about in the apical third or half pale yellow, tarsi pale yellow, middle and hind tarsi more or less slightly shaded; joints 1 and 2 of the antennae dark, 2 yellowish at apex, 3 to 6 pale yellow, but 5 and 6 sometimes slightly shaded at apex, 7 usually shaded in apical half, 8 dark (in *pharao*, joint 7 is more extensively

pale than in the new species). Bristles light, excepting the anals which are dark; wings colourless.

Head longish, length (incl. iap. 234) 216, width 173 μ, sides slightly and evenly rounded, broadest about the middle, distinctly narrowed towards base (in *kilimandjaricus* parallel-sided throughout); eyes much smaller than in *pharao*, 88 μ, ocelli situated rather far in front; postocular bristles very moderately long, 44-48 μ, pointed, distant from the eyes for about 16-18 μ; mouth-cone very short, broadly rounded. Antennae slender, similar as in *pharao* but the joints somewhat less elongate; joint 3 strongly asymmetrical, outer surface sometimes even somewhat concave, and interiorly beyond base, somewhat convex, with two tender sense-cones, joint 4 with four sense-cones, the following as well with the normal number of cones, the terminal joints slender; antennae length 320-346 μ; measurements of joints of holotype: 22-25(b. 31-32, t. 25-27), 45(27), 41-42(27), 48(28), 48(25), 43(22), 41(18), 25(11) μ; a larger specimen, from joint 2, 45-48(28), 43-45 (27), 53(28), 53(25), 48(22), 43(18), 27(11) μ. Prothorax length 156, width including coxae (no pressure) 282 μ, without 250 μ; bristles at fore angles distinct but moderately developed (in *kilimandjaricus* vestigial, in *pharao* longer), about 25 μ, pointed, hind angle bristles short, 40-42 μ, pale, pointed or nearly so; fore legs scarcely enlarged, fore tarsi with distinct toothlet. Pterothorax longish, length 329-346, width 286-303 μ; wings (length 813-848 μ) well constricted in the middle, much widened towards apex, basal wing bristles small, tender, 28-29, 31-34, and 34-36 μ, b.1 pointed to rounded at tip, 2 and 3 pointed; double fringe hairs inserted comparatively far from apex of wings, 4-7 (mostly 6). Abdomen elongate, the inferior spine of the 1st joint of the hind tarsi rather stout (strongest in *H. certus* Pr. and *H. eragrostidis* Pr.); tergite 9 with two micropores on each side about the two macropores; b.1 of the bristles of segment 9 pointed, fine, 80, b.2 about 92 μ or longer; tube short, conical, dorsal length 100 (lateral 108), width across base 60-62, at tip 32 μ; lateral anal bristles longer than the tube, 128-132 μ. — Total body length (very much distended): 2,34-3,1 mm.

Male: Very similar to the female in every respect, except that b.1 of segment 9 of the abdomen is longer, about 100 μ, b.2 short, 40 μ, but not very stout, b.3 about 112 μ, hair-like; tube a little longer, 108 μ, width at base 56, at tip 32 μ. — Measurements in μ: Head length 190(incl. proj. 200), width 156; eyes 76; antennae 310; antennal joints, 22, 42, 39, 45, 45, 42, 41, 22; prothorax length 148, width without coxae 216; pterothorax width 268; hind angle bristles of prothorax 44-48. — Penis of equal width throughout, very narrowly split in the middle of extreme apex.

Habitat: Sudan, Managil, Blue Nile Province, 16.1.1930, numerously at the roots of the grass *Cymbopogon proximus* Stapf (H.B. Johnston coll.;

W.P.L. Cameron, No. 145), type specimens; other material: Wad Shair, 21.3.1929, on *Cymbopogon nervatus* Chi., W.P.L. Cameron coll., No. 129; 1 female accidentally on cotton, Khartoum, 29.9.1926, Bedford coll., No. 9.

This species which Mr. Cameron collected in great numbers, much resembles *H. pharao* which I first thought identical with it but it is no doubt specifically different; the bristles of the prothorax and those of the base of the fore wings are shorter and pointed, the double fringe hairs somewhat less in number, on an average, the antennal joints decidedly shorter, than in *pharao*, and the middle and hind tibiae always unicolourous; the head is distinctly stouter in *pharao*. From *H. kilimandjaricus* Tryb., which I know from paratype specimens, the new species is easily separated by the shape of the head and the longer and paler prothoracic bristles. *H. (Ch.) faureanus*, another grass-feeding *Haplothrips*, has but 2 sense-cones on joint 4(four) of the much shorter antennae, and so on.

Haplothrips tolerabilis spec. nov.

Female: More or less dark brown with much mesodermal pigment, middle and hind tibiae unicolourously dark, fore tibiae yellowish at apex, tarsi pale yellow, middle and hind tarsi slightly shaded with grey; antennal joints 1, 2 and 6-8 wholly dark, joints 3 and 4 pale yellow, but particularly above more or less cloudily darkened, 5 at base, at least below, yellow; wings colourless, bristles pale, anals shaded.

Head length 164, width 156 (in the somewhat flattened type 163), eyes length 72 μ; cheeks slightly rounded, slightly converging posteriorly, mouth-cone short, broadly rounded; postocular bristles 8-10 μ distant from eyes, their length 36-40 μ, pale, distinctly knobbed. Antennae short, 277-286 μ; measurements of joints, 20(b.31, t.24), 42(25), 36-39(25), 45(29), 41(24), 38(21), 32(19), 22(12) μ; joint 1 narrowed towards apex, 3 but 1,5-1,6 times as long as broad, asymmetrical, much less elongated than in *H. sorghi* Bagn. or *H. cahirensis* Tryb., with but *one* sense-cone, joint 4 with four, joints 5 and 6 with $1+1+^1$, 7 with 1 d; terminal joints moderately long, 8 short, broad at base. Pronotum length 116-120 μ, width 225-237 μ; all bristles knobbed, coxals as well, anterior angulars 32, posterior angulars 40 and 50 μ in length, pale. Fore legs simple, fore tarsal tooth wanting; bristles at apex of joint 1 of hind tarsi not spine-like; mesothorax length 277-294, width 268-277 μ; wings narrow, width near tip but 58 μ; double fringe 5-7 in the two specimens at hand; basal wing bristles 1 and 2 short, knobbed, 32 and 32-34 μ, resp., b.3 very long, bent, very narrowly knobbed, 60-80 μ. The small lateral bristles at the sides of the tergites between the two blunt bristles are longer than in *H. sorghi*, 20 μ; bristles on segment 9 light, pointed, 80-84 μ, b.2 88-96 μ; the dorsal bristles are knobbed up to

segment 8; tube length 96 μ (dorsally), or 100-102 (laterally), width across base 52, at apex 31 μ; anal bristles longer than the tube, 132-140 μ. — Total body length (distended): 1,63-1,76 mm.

Habitat: Sudan, Wad Shair, 21.3.1929, on *Cymbopogon nervatus* Chi., 2 specimens along with great numbers of *H. caespitis* and *H. faurcanus*. The above grass is very likely not the host plant of *H. tolerabilis*.

This species comes near to *H. cahirensis* Tryb. and especially *H. sorghi* Bagn., agreeing in having but one sense-cone on joint 3 of the antennae, no tarsal tooth in the female, knobbed dorsal bristles, a.s.f., but differing from both by the much darker antennae, the much shorter joints 3 and 4, the shorter head, the lesser number of double fringe hairs than in *cahirensis* and in most of the specimens of *sorghi*, and especially in having b.3 of the basal wing bristles exceptionally long and fine, decidedly longer than in *sorghi*.

Karnyothrips cameroni spec. nov.

Female: Head and thorax chestnut-brown, the tube, segment 9 of the abdomen and the dorsal apical part of segment 8 (perhaps sometimes also segment 7), the coxae and fore legs (excepting the apical third of the latter which is yellow), of the same brown colour, tibiae of fore legs and the whole middle and hind legs pale yellow; antennal joints 1 and 2 dark, 2 somewhat paler towards tip, 3 to 5 pale yellow, in fully mature specimens, however, joints 4 and 5 may be somewhat shaded, 6 certainly dark in such specimens; in the unique example, however, pale brownish, except the base which is pale yellow, 7 and 8 dark; it is possible that the wings show a slight shade in fully coloured specimens, the one at hand has only the scale brownish; anal bristles dark, the others pale.

Head about as long as wide (147 : 142-148), about parallel-sided or slightly narrowed towards base; eyes length 60 μ, cheeks behind them 100 μ; postoculars very close (7-8 μ) to the eyes, straight, long, 50-52 μ, strongly knobbed; distance (inner) of hind ocelli 28 μ; mouth-cone short, broadly rounded; surface of vertex smooth, a few cross-wrinkles are noticeable posteriorly. Antennae length 294-311 μ, joint 1 short, much narrowed towards apex, 3 symmetrical, with two, 4 with four very well developed sense-cones, 5 and 6 with $1+1+^1$ each, 7 with 1 d; joint 8 much narrower at base than 7 at apex but not constricted at base; measurements of joints, 16-20 (b. 31-34, t. 22), ? (25), 44 ? (25), 40(27), 40(19), 34(17), 28(14) μ. Pronotum 120 μ, width without coxae perh. 208 μ; bristles knobbed; anterior angular bristles about 36 μ, laterals 40-44 μ, posterior angulars 48 μ, and (the exteriors) 52-56 μ; coxals as strongly dilated as the others, length at least 44 μ; fore legs distinctly enlarged, fore tarsi with stout, obliquely forwardly directed tooth. Pterothorax width 240-260 μ, length 225-242 μ;

wings narrow, little widened from the constricted part onward, fringe hairs not very dense, they are 12-16 μ distant from one another at the narrowest part of the wing; duplicated cilia 4-6; bristles at base of fore wing 40, 42-44, 60-65 μ, hyaline, much dilated at tips. Bristles on segment 9 pointed, b.1 92, b.2 104-112 μ, the latter therefore much shorter than usual; the longest (lateral) anal hairs about 150-160 μ; tube 100 (dorsally), 108-112 μ (laterally or ventrally), width at base 50, at apex 28 μ, evenly conical.

Habitat: 1 female, Sudan, Wad Medani, 21.7.1927, in twig galls on *Zizyphus spina christi*, along with *Haplothrips sorghi* Bagn. (W.P.L. Cameron, No. 102).

I have dedicated this remarkable species to Mr. W.P.L. Cameron, to whom we owe so many most interesting discoveries to the Sudan Fauna.

Karnyothrips cameroni cannot be confused with any one of the similarly bicolorous species; *K. dodgei* (Hood) and *K. pullatus* (Hood) have pointed bristles, *K. melaleucus* (Bagn.) has a long, slender head and very long bristles on abdominal segment 9; *K. rhopalocerus* (Hood) is characterized by the peculiar structure of the two terminal antennal joints; *K. errans* (Mlt.) is a dark species, extremely close to *K. flavipes* (Jones) (=*longisetis* (Bagn.)), and *K. ochropezus* Hood has the head much longer.

Dolichothrips micrurus (Bagnall)

Liothrips micrurus Bagnall, Ann. Mag. Nat. Hist., Ser. 8, XIII, 1914, p. 292, is not a *Liothrips* but a *Dolichothrips* and is identical with *Dolichothrips giraffa* Karny (1920, Akad. Anz., p. 2; 1921, Denkschr. Akad. Wiss. Wien, 98, p. 14); it therefore has to be called : *Dolichothrips micrurus* (Bagnall) (1).

Liothrips gymnosporiae spec. nov.

Female: Black, all legs and tarsi blackish; antennae from joint 3-6 pale yellow, 7 and 8 shaded but 7 paler at base, sometimes the whole basal half yellow; bristles dark, however the laterals of the abdomen and all on segment 9 light; bristles at base of fore wing rather pale; wings colourless excepting the yellowish basal plate.

Head 1.6-1.7 times as long as broad, length (from fore margin of eyes) 337-355 (including iap. 363-390), width across eyes 202 μ; eyes (length 116-120 μ) not so evenly longish oval as in *L. habitator*, more shortly rounded, thus somewhat truncate behind; cheeks parallel-sided, surface of vertex (in cleared specimens) with very fine and close cross-wrinkles; front ocellus on a distinct hump, surpassing fore margin of interantennal projection

(1) See also : Philippine Journ. Sci., 57, 3, 1935, p. 363, where I erroneously drew up the inverse synonymy.

and the middle of the first antennal joint; distance of inner margins of hind ocelli 36 μ; postoculars well developed, rigid (easily broken off), *far behind the eyes*, 76-92 μ distant from hind margin of eyes, 136-156 μ from hind margin of vertex, their distance from each other 140-145 μ, their length 108-125 μ; they are blunt; mouth-cone pointed; antennae length 570-605 μ; measurements of joints (of holotype) from joint 2: 68(36), 124-128(34), 116(40), 100(36), 88(34), 70(26), 42(16) μ; the same measurements of a small specimen: 66-68(36), 116(34), 102(38), 90(34), 76(32), 58(27), 40(14) μ; one sense-cone on joint 3, 1+2+1 on joint 4. Pronotum length 152-160. width without coxae 380-400 μ; fore angle bristles 52-60, mid-laterals 88-116, hind angulars (both pairs) 124-152 μ. Praescutum with anastomosing cross-wrinkles, metanotum very densely and finely longitudinally striated; legs slender, *fore tarsi unarmed in both sexes*, inner margin of fore tarsus of female straight (in *habitator* and *postocularis* convex); pterothorax width 450-536 μ; bristles at base of wings blunt, their length 84-88, 100-112, and 104-116 μ; wings not striped, with 16-19 duplicated cilia; bristles on segment 9 of the abdomen pointed, b. 1 220-228, b. 2 220-240 μ; tube 264-280 (dorsally) or about 285 μ (laterally), width across base 98-104, apically 48-52 μ; the longest anal hairs about 220 μ.

Male: Distinctly smaller and slenderer, sides of tube very slightly convex beyond middle and very slightly concave between base and middle; fore tarsi unarmed; 11-17 duplicated cilia. Measurements (of allotype) in μ: head length 286 (incl. ocellar projection 310), width across eyes 188 μ; antennae length 520 μ; joints: ? (40), 56-60(32), 104(30), 88(34), 78-80(30), 70(30), 58(24), 36(14); postoculars 72-76, their distance from eyes 68, from hind margin of vertex 124-128; pronotum length 128, anterior angular bristles 36-44, mid-laterals 64-68, posterior angulars (both pairs) 88-92; bristles at base of fore wings 64, 76, 80; pterothorax width ab. 400 (in small specimens 330); tube length (dorsally) 212 (in a paratype 240), laterally 220, width across base 80, at apex 38; b. 1 on segment 9 176-180, b. 2 (stout) 64.

Habitat: Sudan, Khamisa, Dinder, 19.2.31, in rolled leaves of *Gymnosporia senegalensis* Lam. (No. 232); Beika Eskape, Wad Medani, 4.1.30, on leaves of *Gymnosporia senegalensis*, coll. A.P.G. Michelmore (Cameron No. 124)

This *Liothrips* species was found in the leaf rolls, along with another *Liothrips* sp. (the latter in much greater number), near *L. postocularis* Ka. and *L. habitator* Pr., which can only be dealt with after comparison with the type of *L. postocularis*.

Phlaeothrips (Hoplandrothrips) sycomori spec. nov.

(Figs 5, 6 and 7)

Female: Chestnut to dark brown; femora, middle and hind tibiae and tarsi dark; fore tibiae paler, more yellowish brown, yellowish at tips, fore tarsi greyish yellow; joint 1 and 2 of the antennae dark, 2 paler apically,

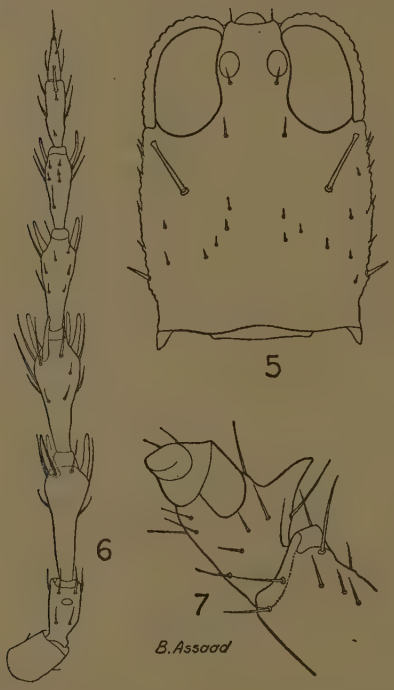

Fig. 5. — *Phlaeothrips (Hoplandrothrips) sycomori,* spec. nov.: head of female.

Fig. 6. — *Phlaeothrips (Hoplandrothrips) sycomori,* spec. nov.: antenna of female.

Fig. 7. — *Phlaeothrips (Hoplandrothrips) sycomori,* spec. nov.: tip of fore tibia, and fore tarsus of female.

3 clear yellow in basal 3/5; 4, 5 and 6 yellow in basal half, *7 yellow in basal third*, 8 dark. Bristles pale, wings colourless.

Large species. Head length 346, width across eyes 242, across cheeks 250 μ, cheeks parallel, constricted behind; eyes length 138 μ, distance of eyes behind ocelli about 64 μ; dorsal surface of vertex with fine cross-wrinkles; postoculars (length 60-68 μ) very moderately long, about 44 μ

distant from eyes, knobbed; cheeks set with 1-3 very small wartlets and 1 pair of spines (32 μ) at about the basal third; mouth-cone long, pointed; antennae length 710 μ; joints, 48-50 (42, t. 39), 73(36), 129(52), 123(53), 109(39), 87(31), 70(25), 48(14-15) μ; joint 1 rather parallel-sided, 2 also slender, 3 strongly club-shaped, more strongly concave interiorly than exteriorly, with three sense-cones (58-60 μ), joint 4 with four, terminal joints slender, 8 not constricted at base. Prothorax much constricted towards anterior margin, length 242, width without coxae 433, otherwise 545 μ; the dark median endothoracic line very short, occupying the middle third, bristles strongly knobbed, the innermost anterior marginals 68, the exterior 70 μ; the laterals and posterior marginals at least 80, the innermost 92-96 μ, their width 6 μ; coxae large; one coxal bristle about 68 μ, light, thick, in addition, the coxae bear 4-5 short dark spines; fore femora enlarged, fore tibiae with a small, bluntly triangular plate at apex within (2); fore tarsi with strong tooth. Width of pterothorax 605 μ; net-like structure of metanotum composed of very dense longitudinal lines; wings (length about 1.52 mm.) broad, normal, basal bristles 1 and 2 dilated, 64-68, and 72-76 μ, resp., b. 3 pointed, 112 μ; 28-34 duplicated cilia; middle and hind legs slender. Bristles on segment 9 of the abdomen (b. 1 broken off in all specimens) b. 2, 290-310 μ; tube length 277, width across base 112, at apex 52 μ; terminal bristles about 280 μ; chitinous rod within segment 9 very short, knob-like.

Habitat: Females only, larvae and pupae, Sudan, Tob-el Ahmar, Rahad River, near M. Bartawi, 16.3.1930, under bark of *Ficus sycomorus* (W.P.L. Cameron, No. 83).

This species is most closely allied to *Phlaeothrips glabrigenis* Pr., which Hood thinks to be better placed in *Hoplandrothrips* than in *Phlaeothrips* s. str. an opinion which is confirmed by the structure of the larva. — *Ph. glabrigenis* has more slender antennae, the 3rd and 4th joints of which are more elongate, 4 somewhat longer than 3, 2.6-2.7 times as long as broad, 4 almost 2.8 times; the postoculars are shorter in *Ph. sycomori* than in *Ph. glabrigenis*, and the latter has no spines at the cheeks, a.s.f.; *H. sycamorensis* Mason, (California) belongs to another group.

Larva.

II. Stage: It is characterized by the very slender head, and the measurements of the antennal joints.

The specimens at hand are yellow but they show traces of red meso-

(2) This plate seems to be also present in *Phlaeothrips glabrigenis* Pr. though it is not mentioned in the original description.

dermal pigment here and there, and thus it may be possible that the larva of this species is entirely red when alive; the middle and hind femora are darker than the tibiae; segment 10 of the abdomen darker than 9 but paler at base; no small central plate on the head, pronotal plates entire; antennae greyish yellow at base, but strongly shaded from the apical 2/5 of joint 3 to tip of antennae (4-7 entirely dark).

Head without horn-like projections, cuticula smooth; length of head 172-176, interantennal distance 20 μ, width across eyes abou 98 μ; interior eye bristle 32, postoculars about 40 μ, b. 2 (lat.) 16, both dilated at tips; antennae length 345 μ; joints, 28 (b. 31, t. 25), 40(23), 102-104(24), 68(24), 54(22), 36(16), 20(11) μ; sense-cones on joint 3 and 4 small, joint 7 separated from joint 6 by a pale suture; pronotum, b. 1, 22-25, knobbed as all the following; b. 2, 17-20 μ; b. 3, 42; b. 4, 20-22; b. 5, 67-70; b. 6, 70; b. 7, 70 μ. B. 6 of mesonotum 50-53 μ. B. 1 of abdominal segment 1, 32-36, b. 2, 44 μ; segment 7, b. 1, 48-52, b. 2, 60-68 μ; segment 8, b. 1, 60, b. 2, 64; segment 9, width across base, 116, tapering towards apex, width apically ab. 80 μ; basal width of segment 10, 68 μ; bristles on segment 9 broken off in all specimens; terminal hairs, 400 μ.

In my key of the larvae of the *Phlaeothripidae* (Treubia, VIII, Suppl., p. 250), this larva comes under 29(30) and is easily distinguished from the larva of *Liothrips hradecensis* Uz. by the dilated bristles 1 of the pronotum and all other pronotals, besides, by the longish, characteristically shaped head.

Elaphrothrips parvus spec. nov.

(Fig. 8)

I only know a single specimen of this species, which though somewhat discoloured by the preservation, well permits its description even as to the colouration.

Male: Brown, most likely blackish when fresh, middle and hind legs wholly dark, fore tibiae somewhat lighter interiorly than at their margins but not pale yellow, the tarsi shaded as well; joint 3 of the antennae pale yellow, slightly cloudily shaded at apex, joint 4 pale yellow in basal half (or somewhat less), 5 yellow in basal third, the remaining joints dark, bristles light, those on segment 9 were all dark, at least at base, anals dark.

Head length from fore margin of eyes 398-407 (including projection 460), width across eyes 190, behind eyes (narrowest part) 164, before base 183 μ; eyes length 112; prolongation of head 110:58 μ, i.e. 1,8-1,9 times as broad as long; anteocellar and postocular bristles long, knobbed, perhaps hyaline, the latter 100-104 in length; eyes protruding but laterally obliquely somewhat truncate (flattened), somewhat angularly protruding in posterior fourth; no distinct tempora; cheeks behind eyes about 311 μ in length; postoculars

92 μ distant from each other; cheeks with very few, very weak light spines, the longest, 24-28 μ, colourless, 36 μ distant from eyes. Mouth-cone short, broadly rounded. Antennae length but 683 μ; measurements of joints: 44-48(44), 72-76(40), 134(40), 128(40), 118(35), 88-92(31), 56(28), 56(20) μ. Prothorax length about 190-200, width without coxae 310 (incl. coxae 370) μ, laterally beyond the middle somewhat angular; anterior angular bristles 48-52 μ, hyaline as the postero-angulars, the latter (interiors) 72-80 or

Fig. 8.

Elaphrothrips parvus, spec. nov., ♂: Anterior part of the body.

(exteriors) about 92 μ, all knobbed; fore legs weak, length of femora about 310, width 113 μ, set with tender, pale bristles only, inner margin of fore tibiae straight, *not* obliquely truncate before apex within, fore tarsi with very small tooth. Mesothorax width about 390 μ; wings very probably colorless and bear about 16 duplicated fringe hairs; b. 1 and 2 of the basal wing bristles are distinctly dilated at tips, b. 3 rounded at tip and much longer, about 120 μ. B. 2 on segment 9 about 340-345 μ, the ventral oval plate of segment 9 without spines but with two stout bristles on their place; tube evenly conical, three times as long as broad at base, length 292, width across base 96 μ; terminal bristles about 330 μ. — Total body length (distended): 2.99 mm.

In following up my key (Rev. Zool. & Bot. Afr., XXII, 3, 1932), one

gets to *E. brachyurus* Bagn. (t.c.p. 325); this species however has the tube very short (2.2 times as long as broad at base; I have also compared with all the species recently described by Bagnall (Ann. Mag. Nat. Hist. (10), XV, 1935, p. 130 (3)) but none of them can be identified with *E. parvus*.

Habitat: Sudan, Talodi, Nuba Mountains, 18.XI.1926, on the wing, coll. W. Ruttledge (W.P.L. Cameron, No. 82).

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(3) Bagnall's *E. clarispinis* (t. c. p. 134) has to be renamed owing to *E. clarispinis* Pries., Konowia, XIII, 3, p. 196, 1934; I propose the name *bagnallianus* nom. nov. for the Rhodesian species.

IVme CONFERENCE INTERNATIONALE POUR LES RECHERCHES ANTI-ACRIDIENNES.

Le Caire, 14-22 Avril 1936.

Réception des Délégués par la Société Royale Entomologique d'Egypte

Allocution du Président, prononcée par Monsieur le Professeur H. C. Efflatoun Bey, Vice-Président de la Société.

Monsieur le Ministre,
Excellences,
Mesdames,
Messieurs,

C'est pour moi un sujet de haute fierté de m'associer aux souhaits de bienvenue qui vous ont été exprimés, ce matin, par Son Excellence Sadek Wahba Pacha, Ministre de l'Agriculture, au nom du Gouvernement de Sa Majesté le Roi Fouad 1er.

Il m'est agréable de constater l'importance toujours plus considérable que les Gouvernements, ici représentés, attachent au Problème Acridien. Je me fais un devoir de payer un juste tribut de reconnaissance aux savants éminents qui ont bien voulu laisser pour un temps les charges importantes de leurs fonctions pour prendre part aux travaux de cette Conférence et y apporter leur précieuse collaboration.

Ici, plus qu'ailleurs, vous pourrez saisir la portée pratique de vos travaux. La plupart d'entre vous, durant le trajet de nos ports jusqu'au Caire, ont pu se rendre compte à quel point l'économie égyptienne dépend de son Agriculture et comprendre l'anxiété bien légitime de nos populations devant les invasions acridiennes.

Vos précédentes Conférences ont apporté une large contribution à l'œuvre scientifique universelle. Elles ont décidé l'adoption d'une nomenclature uniforme ; des communications d'une haute portée ont fait mieux connaître les cycles évolutifs des sauterelles, le nombre de leurs générations successives, leur maturation sexuelle et bien d'autres questions qu'il serait trop long d'énumérer ; enfin, les moyens les plus adéquats pour combattre ce redoutable fléau ont été suggérés.

Mais il reste encore beaucoup à faire, Messieurs. Certaines invasions demeurent hors de tout contrôle humain, malgré les précautions prises et les moyens de défense employés.

C'est à nous de co-ordonner ici nos efforts pour étudier ce problème si complexe et je me permets d'espérer que cette Conférence marquera une nouvelle étape dans la lutte contre les sauterelles, spectre de désolation et de famine.

En unissant les découvertes de laboratoire aux observations faites dans les zones grégarigènes et sur les champs, il nous sera possible de tirer des conclusions plus précises et de prendre par la suite d'utiles résolutions.

J'ai été infiniment heureux de ce que notre Gouvernement ait choisi le Siège de la Société Royale Entomologique d'Egypte pour y tenir les assises de cette Conférence. En ma qualité de Président de cette Institution, permettez-moi de vous dire que notre Société est fière de mettre à la disposition des entomologistes les ressources dont elle dispose. Vous êtes ici chez vous. Nos locaux, nos collections, nos laboratoires et notre bibliothèque sont à votre entière disposition.

Il m'est agréable d'espérer que nos hôtes étrangers emporteront de leur séjour sur cette terre d'Egypte, avec les résultats féconds de leurs efforts, le plus heureux des souvenirs.

Ci-contre :

Fig. 1 — Les délégués au thé offert par la Société.

Fig. 2. — Les délégués photographiés devant le Siège de la Société.

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Séance du 25 Mai 1936

Présidence de Monsieur H. C. Efflatoun Bey, *Vice-Président.*

Panégyyriques:

D'une voix émue, Monsieur le Professeur Hassan Chaker Efflatoun Bey fait le panégyrique de l'Auguste Bienfaiteur de la Société, feu S.M. le Roi Fouad Ier, et de son dévoué Président, feu S.E. le Docteur Mohamed Shahine Pacha (1).

En signe de deuil, la séance est suspendue durant quinze minutes.

Présidence de la Société:

Le Conseil nomme un Comité chargé de demander audience à S.E. le Président du Conseil des Ministres en vue de la nomination du nouveau Président de la Société conformément à l'Article I des Statuts.

Font partie de ce Comité: Messieurs le Professeur Hassan Chaker Efflatoun Bey, le Professeur Docteur H. Priesner, Fouad Abaza Bey, Abdel Megid El Mistikawy, le Docteur Kamel Mansour et Anastase Alfieri.

Nomination:

La Fund. Bib.-Ka Sredne-Asiatik. Gos. Universitata, de l'U.S.S.R., est admise à faire faire partie de la Société en qualité de membre titulaire.

(1) Ces deux allocutions sont publiées aux pages XXX-XXXIV du présent Bulletin.

Control of Mites on Insect-Stocks and on Fungus Cultures by means of Fumigation[1]

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The origin of this paper was the urgent need to find some way of saving large numbers of badly infested insect-stocks which were being reared at the Biological Field Station of the Imperial College of Science and Technology at Slough. That the main object has been attained is shown by the fact that nearly all the present stocks, most of which are now substantially mite free, have been bred from the original badly infested stocks after fumigation. As a matter of urgency these early experiments were carried out at room temperature and humidity. Their success led to experiments — likewise successful — with a few fungus cultures. Later it was decided to repeat most of the work at constant temperature and humidity in order to make more precise recommendations and to confirm certain results upon which some doubt had been cast. This has afforded an opportunity to extend the range of stocks and cultures studied; and to emphasise the need for care in applying our fumigation method when the conditions are not identical with ours.

The nature of the damage caused by mites to stocks of insects is different from that caused to fungus cultures.

The former damage is chiefly dependent on the genus and species of mite, the latter is not; for whereas any mite walking over a culture will contaminate it with foreign spores, only mites of a carnivorous habit can

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(1) This work was carried out at the Biological Field Station of the Imperial College of Science and Technology at Slough in 1930-1931.

seriously affect most stocks of insects, although it has been suggested that the mere irritation of the insect which is produced by all mites may be of considerable importance.

Mites belonging to three different families have been identified during the course of the work, of which one is a carnivorous family, feeding mainly on insect eggs. We have endeavoured to work with as large a number as possible of highly chitinised mites, and our recommendations refer to the concentrations required to eliminate them.

These mites are the most resistant to our fumigants and they happen to include mites from the carnivorous family. If insects or cultures particularly susceptible to damage by fumigation were being dealt with, a smaller concentration than that recommended might be worth trying, in the hope that only less resistant mites were present.

The literature on control of mites is not extensive.

The earliest important paper is by Jewson and Tattersfield (Ann. Appl. Biol., 1922, IX, 213) in which ammonia gas is stated to be toxic to mites and to fungi, while pyridine is reasonably toxic to mites and considerably less harmful to fungi. The cultures have to be well aired and then subcultured after fumigation. Both fumigants have objectionable odours, that of pyridine being very persistent. Sulphur has long been recommended as a dust for mite control. List, Daniels & Bjurman (J. Econ. Ent., 1928, XXI, No. 6, 940) report the results of repeatedly dusting sulphur in bins of grain containing mite infested stocks of *Sitotroga cerealella* Oliv. Of the two families of mites identified, the Gamasids were killed only if coated with sulphur within thirty minutes of emerging from the eggs while there was no evidence of the effect on *Pediculoides ventricosus*.

After some time, the egg production of *Sitotroga* increased, and no stage appeared to suffer any ill effect. Hill (J. Council Sc. Ind. Res., Melbourne 1928, No. 6, 330) has noted an example of a severe attack by Gamasid mites of *Plodia interpunctella* Hb. The mites were first detected in the month of January, and by March they had infested all the adults and eaten many eggs. Fifteen to fifty mites were found on single moths, many of which were malformed and incapable of flight. Gahm (J. Econ. Ent., 1930, No. 4, 23) found that the mite *Linopodes antennaepes*, a pest of cultivated mushrooms, was killed at a temperature between 38 & 53° C and a relative humidity of 89 %. Evans (J. Council Sc. Ind. Res., 1930, III, No. 2) failed to kill the mites *Pediculoides ventricosus* by fumigation with carbon disulphide. He eliminated the mites from wheat used for feeding *Sitotroga cerealella* by heating it for 8 hours at 52° C.

It will be seen that three substances are said to be available for the control of mites, ammonia, pyridine and sulphur.

Sulphur is supposed to be effective only against newly emerged mites.

In confirmation, we have observed that mites are apparently unaffected by smothering with sulphur.

Ammonia has many drawbacks as a differential fumigant. It is an active and corrosive gas, it is exceedingly soluble in water and thus unsuited for fumigation of material of high water content. It must be derived from a concentrated solution, which is not at all nice to handle and whose strength is liable to change especially in Summer, thus the dosage is difficult to control.

Pyridine, although serving the purpose for which it was originally tried by Jewson and Tattersfield (loc. cit.), is also far from being the ideal differential fumigant. It has an intolerable and persistent odour, it is soluble in water, it volatilises slowly at room temperature and is apt to condense on the food being fumigated. Above all, although fungus cultures are not killed by Pyridine at the minimum concentrations required for mite control, all stages of insects tried are killed outright.

The only basis that occured to us for the selection of trial fumigants, was that of using fumigants only slightly toxic to insects, in the hope that at the fairly high dosage permissible, mites might be killed.

Acetylene gas was first tried after purification from hydrogen sulphide and phosphine; it proved to be harmless to mites even at very high concentrations, while killing 100 % of the adults of *Ephestia kühniella* Zell.

The next two compounds tried gave us a large measure of success — they were carbon tetrachloride and trichlorethylene. They have very similar properties. They are non-inflammable insoluble in water, and have a pleasant odour, but produce a certain degree of anaesthesia if breathed for a long time. They are only moderately toxic to insects, and in common with most chlorine compounds, produce some anaesthesia in insects. They are not suitable for the fumigation of highly fatty foods for human consumption such as chocolates, though it is unlikely that any insect food would be spoilt by them. They are suitably volatile for use at room temperature if this is not below 18 to 20° C.

For the suggestion to try our last compound, methyl salicylate, we are indebted to Dr. Tattersfield, head of the Insecticides Department at Rothamstead. This is a stable compound with a penetrating and persistent, pleasant odour. It is highly toxic to mites and far less toxic to insects. Unfortunately it is not very volatile, but, being insoluble in fats, it should be especially useful where carbon tetrachloride and trichlorethylene may be unsuitable.

Experimental Substances used for control.

(All were supplied by british Drug Houses Ltd except acetylene. The carbon tetrachloride was of A.R. standard of purity, while the trichlorethylene

was specially purified by British Drug Houses for other fumigation experiments).

1. *Sulphur.* — A fine flour, odourless.

2. *Acetylene.* — Colourless, highly inflammable, and reactive gas prepared by dropping water on to calcium carbide, and bubbling through concentrated caustic soda solution, and then through a concentrated solution of potassium permanganate to remove impurities, especially hydrogen sulphide and phosphine. It was stored over water and diplaced by adding water as required. Acetylene, as commonly prepared, has a foul odour and is poisonous, the pure gas has a pleasant ethereal fruity odour, and is stated to be non poisonous.

3. *Ammonia.* — A colourless gas, corrosive and extremely irritating to the eyes, nose, and throat, highly soluble in water. It was used in its most concentrated solution, specific gravity 0.880, from which most of the gas is liberated under the conditions of the experiment.

4. *Pyridine.* — A colourless liquid of specific gravity 1.003 at 0° C. It boils at 115° C, vapourises rather slowly at room temperature, and condenses readily on some foodstuffs. It has a pungent and disagreable odour. It is a moderately strong base like ammonia and is completely miscible with water.

5. *Trichlorethylene.* — A colourless liquid with a sweet smell, its vapour possesses an anaesthetic effect, sp. gr. 1.47 at 17.5° C., insoluble in water, and a good fat solvent. It is non-inflammable and a moderately toxic fumigant.

6. *Carbon tetrachloride.* — A colourless liquid with a sweet smell, sp. gr. 1.59 at 20.4° C., nearly insoluble in water. It is a good fat solvent and is used in dry cleaning. It is non-inflammable, is used as a fire extinguisher, and is mixed with other fumigants to reduce their inflammability, and possesses the anaesthetic effect.

7. *Methyl salicylate.* — Is a colourless or yellowish oil of peculiar aromatic odour. It has a sp. gr. of 1.1819 at 16° C. and boils under the ordinary atmospheric pressure at 224° C. It is used in the treatment of rheumatism and kindred affections.

It is slightly soluble in water, readily soluble in alcohol, glacial acetic acid, and carbon disulphide.

Small scale experiments.

Wide mouth bottles of 400 cc. capacity with well fitting stoppers freshly lubricated with glycerine were used as fumigation chambers. In the earlier experiments they were left in the laboratory, while in the later ones they were kept in a large box or compartment, the air in which was at constant temperature, 25° C., and constant humidity 80 % R.H.. The mites were

collected in small specimen tubes which were put uncorked into the bottle. A measured volume of liquid fumigant was introduced by means of a blood pipette into each bottle which was then immediately stoppered. At the end of the experiment, the stoppers were removed for airing.

Insects were generally confined in small muslin bags instead of specimen tubes.

The constant temperature and humidity box is fully described in a thesis submitted by one of the authors to London University. It is heavily lagged to reduce heat losses, and all the doors are three inches thick and provided with double glass windows. It is well painted inside and out to limit transpiration of water vapour. The heating element is low wattage asbestos wire resistance band of the unusual length of eight yards to secure uniform heating. The control is by means of a long toluene mercury coil regulator with electric contacts, one of which is oscillating. The current through the regulator energises a small electro-magnet operating a mercury switch in the heating circuit. To maintain a constant relative humidity of 80% at 25° C., it was only necessary to provide a humidifier; sufficient drying taking place through the walls of the chamber.

The humidifier comprised a flask of water kept at about 70° C. by an electric heater, a small blower for blowing a little of the wet air from the flask into the chamber as required, and a motor to drive the blower. Control was provided by a wet bulb toluene mercury regulator which was adjusted to start the motor and blower through a relay when the wet bulb temperature, measured in a strong draught, fell below 22.25° C. The muslin on the wet bulb was kept clean and free from grease by brushing with trichlorethylene. It was kept wet by a drip feed regulated by a sintered glass crucible. The air in the box was powerfully stirred by means of two eighteen inches fans.

The 400 c.c. unstoppered bottles were kept in the box several hours prior to an experiment, as also were the tubes used for the control mites, and jars used for control insects. Immediately a fumigation was started, the control mites were shaken into the special tubes which were then closed with corks covered with tissue paper. Control insects were put into their jars at the same time, and the jars covered with muslin secured by a rubber band.

Large scale experiments.

Fumigation took place in the jars used for rearing the insects. These jars had a capacity of from two to twelve litres, and were generally about one sixth full of insect food. A measured quantity of the fumigant was dropped on to a large filter paper previously placed in the jar, and sealing was effected either by a large bung, if the jars were small enough, or by a piece of plate glass resting on the lubricated ground edge of the jar. Airing was allowed to

occur slowly by removing the bung or glass sheet and the piece of filter paper unless the layer of food was very thick when the contents of the jar were spread out carefully on news-paper for a quarter of an hour, then replaced and the jar covered with muslin in the usual way.

Identification of Mites.

This was kindly undertaken by Miss H. Hora of the Royal College of Science.

One or two samples of mites taken at different times from heavily infested food were found to comprise the following:

Tyroglyphidae:	1. *Tyroglyphus longior* Gervais.
	2. *Aleurobius farinae* L.
	3. *Glyciphagus cadaverum* Schrank, Hypopus Stage common.
Laelaptidae:	4. *Hypopaspis* (species undetermined either nymphs or adults — both are very much alike; predacious on any small soft animal).
Cheyletidae:	5. *Cheyletus eruditus* Schrank (chiefly predacious on Tyroglyphidae).

Hypoaspis and *Cheyletus* are generally predacious on insects, and the former turns out to be one of the mite which we have found to be the most resistant to our fumigants, and on which we have endeavoured to do most of the work.

Its toxic dose is about three times that of our least resistant mites.

For each of the earlier small scale experiments twenty mites were used, and twenty also for the controls. The later experiments, at constant temperature and humidity were performed with not less than one hundred mites for each, and not less than five hundred for the controls.

Insects used.

These were kindly supplied by the entomological section under Mr. Herford and later under Mr. Mansbridge.

Lepidoptera:	
Phycitidae	1. *Ephestia kühniella* Zl., all stages.
Gelechiidae	2. *Sitotroga cerealella* Gl., all stages.
Coleoptera:	
Dermestidae	3. *Trogoderma granarium* Er., adults and larvae.
Bostrychidae	4. *Rhizopertha dominica* F., adults.

Tenebrionidae	5. *Gnathocerus cornutus* F., larvae and adults.
Tenebrionidae	6. *Tribolium castaneum* Hb., larvae and adults.
Tenebrionidae	7. *Tenebrio molitor* L., adults.
Calandridae	8. *Sitophilus granarius* L., adults.
Curculionidae	9. *Caulophilus latinasus* S., adults.
Anobiidae	10. *Sitodrepa panicea* L., larvae and adults.
Cucujidae	11. *Silvanus mercator* Fauv., larvae and adults.
	12. *Cryptophagus* sp., adults.
	13. *Carpophilus dimidiatus*, larvae and adults.

The small scale experiments with *Sitotroga*, were carried out with about five or six cubic inches of heavily infested barley. Well over one hundred moths eventually emerged from all but the most heavily fumigated samples.

Shortage of stocks limited the number of *Tenebrio* adults and of *Rhizopertha* adults to twenty. The number of insects used in the remaining small scale experiments was thirthy. Mites, adult insects, and larvae were examined two or three times after fumigation until on the last examination, it appeared to be possible to classify them definitely as unaffected or dead.

Eggs were examined from time to time until one or two days after it appeared that all the control eggs had hatched. Similarly, pupae were examined until moths had emerged from all, or nearly all the control pupae.

The barley infested with *Sitotroga* was similarly examined until the number of moths appeared to have reached a maximum.

Fungous cultures used.

These were kindly supplied by Messrs Ayre and Vernon of the mycological section.

A. — The following were fumigated only at room temperature:

1. *Aspergillus flavus;* 2. *Aspergillus tamarii;* 3. *Aspergillus terrens;* 4. *Aspergillus fumigatus;* 5. *Aspergillus niger;* 6. *Syncephalastrum cinerea.*

B. — The following were fumigated at 25° C. in an atmosphere of 80 % relative humidity:

1. *Cladosporium herbarum;* 2. *Botrytis cinerea;* 3. *Fusarium* sp.; 4. *Phoma* sp.; 5. *Mucor racemosus;* 6. *Sporotrichum carnis;* 7. *Trichoderma lignorum;* 8. *Oidium lactis;* 9. *Monilia fructigena;* 10. *Scopulariopsis brevicaulis* var. *glabra.*

The cultures were on sloped media. They were fumigated in dessicators and subcultured. Most of the original fumigated cultures continued to grow after aeration.

RESULTS.

Small scale experiments, with mites and insects.

A. — At room temperature and humidity.

1. — AMMONIA. — CONCENTRATION IN CCS OF 0.880 AMMONIA SOLUTION PER LITRE.

(a) Against mites — 20 for each experiment; 20 for control, all survived.

Exposure 4 hours.

Temp. °C.	Concentration ccs per lit.	% Mortality	Temp. °C.	Concentration ccs. per lit.	% Mortality	Temp. °C.	Concentration ccs. per lit.	% Mortality
18	0.0025	0	18	0.025	75	19	0.06	100
18	0.0050	0	17	0.030	90	19	0.07	100
18	0.0750	0	17	0.035	90	19	0 08	100
18	0.0100	0	19	0.040	90	19	0.09	100
18	0.0150	50	19	0.045	95	22	0.10	100
18	0.0200	66	19	0.050	95	—	—	—

(*b*) *Against* Plodia interpunctella-*larvae*.

Exposure 4 hours.

Temp. °C.	Concentration ccs. per lit.	Mortality
19	0.06	100

(c) Effect on dried fruit (Sultanas). — Quantity of fruit, 1 1/4 litres; capacity of jar, 2 1/2 litres, exposure 24 hours; concentration of ammonia 0.2 ccs. of 0.880 ammonia solution per litre. No smell of ammonia could be detected on opening up. It is suggested that the ammonia dissolves in the water held by the fruit, possibly with chemical combination.

2. — PYRIDINE. — CONCENTRATIONS IN CCS. OF LIQUID PER LITRE.

(a) Against mites — 20 for each experiment, 20 for control, all survived.

Exposure 4 hours

Temp. °C.	Concentration ccs per lit.	% Mortality	Temp. °C.	Concentration ccs per lit.	% Mortality
17	0.0025	60	19	0.050	100
17	0.0050	70	20	0.060	100
17	0.0100	75	20	0.075	100
17	0.0150	80	20	0.085	100
17	0.0250	85	—	—	—

Exposure 2 1/2 hours

Temp. °C.	Concentration ccs per lit.	% Mortality	Temp. °C.	Concentration ccs per lit.	% Mortality
17	0.1	100	17	0.4	100
17	0.2	100	17	0.5	100
17	0.3	100	17	0.6	100

(b) Against Plodia interpunctella-*larvae in dried fruit, and against mites. — 20 larvae and 20 mites for each experiment, same number of controls, all survived.*

Exposure 4 hours

Temp. °C.	Concentration ccs per lit.	*Plodia* % Mortality		Mites % Mortality
		after 4 days	after 15 days	
18	0.05	50	100	100
18	0.10	66	100	100

(After aeration the surviving larvae were left to feed on the fumigated fruit).

(c) Effect on dried fruit — Sultanas.

Exposure 4 hours

Temp. °C.	Concentration ccs per lit.	Odour of pyridine in fruit after airing			
		12	24	36	48 hours
18	0.05	strong	strong	not strong	weak
18	0.10	strong	strong	fairly strong	weak

In so far as smell is an indication of concentration of pyridine, experiment (c) suggests that insects on dried fruit will be exposed to moderate concentrations of the vapours for a long period during aeration. During this period too, they may consume a certain amount of fruit containing pyridine, which may thus act as a stomach poison.

Numerous similar experiments have shown the unsuitability of Ammonia and of Pyridine.

3. Trichlorethylene. — Concentrations in ccs. of liquid per litre.

(a) Against Mites — about 30 for each experiment.

Exposure 4 hours, Temperature 17° C.

Concentration ccs per lit.	Examined		
	Immediately after fumigation	16 hours later	1 week later
	Number alive	Number alive	Number alive
0.250	—	—	—
0.225	—	—	—
0.200	—	—	—
0.175	—	—	—
0.150	1	1	1
0.125	2	2	2

(*b*) *Against eggs of chiefly* Tyroglyphidae *mites on small quantity of* barley, not less than 12 per grain.

Exposure 24 hours

Concentration 0.225 per litre, Room temperature:
All eggs killed.

(c) Against eggs of mites and adults or nymphs collected in tubes.

Exposure 24 hours, Temperature 22° C.

Concentration ccs per lit.		0.225	0.250	0.300
Examined	immediately after fumigation	none alive	none alive	none alive
	1 week later	none alive	none alive	none alive

(d) Against Sitotroga cerealella *on mite infested barley (all stages).*

Concentration 0.225 ccs. per litre,
Exposure 24 hours, Room temperature.

On the day following the fumigation, 185 grains of barley were carefully opened with a scalpel and examined under the binocular microscope with the following results :—

Eggs. — A considerable number found on the grain, of which about 30 % eventually hatched.

Larvae. — Twelve larvae were found inside the grain, all of them were alive and apparently unaffected.

Pupae. — Thirteen pupae were found, all alive and apparently unaffected — moths emerged from two of the pupae.

Moths. — All dead, a very weak dose of any of our fumigants will kill the moths.

Mites. — No mites were found alive even inside the grain, or in hollow grains.

(*e*) *Against* Sitotroga *first stage larvae fully exposed, not protected by being inside the grains.*

Exposure 4 hours, Room temperature,
Concentration 0.150, 0.175, 0.200 ccs. per litre: All killed.

(f) Against Tribolium castaneum-*larvae. — 10 larvae at each concentration, 15 as control, all just covered with flour.*

Exposure 4 hours, Room temperature.

Concentration ccs per lit.	EXAMINED AFTER		
	one day	two days	four days
0.150	5 moving	4 moving	4 alive
0.175	3 moving	3 moving	2 alive
0.200	0 moving	—	4 alive
0·225	1 moving	3 moving	3 alive
CONTROL	15 alive	— —	14 alive

(*g*) *Against* Sitophilus granarius-*adults. — 20 insects used.*

Exposure 4 hours, Temperature 22° C.

Concentration ccs per lit.	EXAMINED AFTER	
	2 days found alive	8 days found alive
0.250	8	8
0.225	13	13
0.200	10	10
0.175	17	17
0.150	17	17
CONTROL	all alive	all alive

4. — CARBON TETRACHLORIDE CONCENTRATIONS IN CCS. OF LIQUID PER LITRE.

(a) Against Nymphs and adults mites, 50-80 per experiment.

Exposure 4 hours, Temperature 22-24° C.

Concentration ccs per lit.	EXAMINED AFTER		
	one day apparently alive	five days apparently alive	seven days apparently alive
0.250	none	two	none
0.300	»	none	»
0.325	»	»	»
0.350	»	»	»
0.400	»	»	»
0.450	»	»	»
0.500	»	»	»

(b) Against Tribolium castaneum-*adults: 15 insects for each concentration.*

Exposure 4 hours, Temperature 19° C.

All insects died even at as low a concentration as 0.25 ccs. per litre.

(c) Against Tribolium castaneum-*larvae: 10 insects for each experiment, 15 as control.*

Exposure 4 hours, Temperature 20° C.

Concentration ccs per lit.	EXAMINED AFTER		
	one day	three days	five days
0.325	4 moving	3 moving	3 alive
0.350	4 moving	3 moving	3 alive
0.400	3 moving	2 moving	1 alive
0.450	3 moving	3 moving	3 alive
CONTROL	all alive	— —	all alive

Carbon tetrachloride and trichlorethylene both proved fatal to all stages of *Ephestia kühniella* at the lowest concentration fatal to mites.

The above experiments are a fair sample of those which encouraged us to try to free cultures from mites.

B. — At 25° C. and 80 0/0 Relative humidity.

1. Against Mites :— Number in each experiment — over 100; number in each control — over 500.

Exposure 24 hours, Concentrations in ccs of liquid per litre.

(a) *Trichlorethylene.*

DOSE	0.010	0.015	0.020	0.025	0.050	0.075	0.100	0.125	0.150	0.175	CONTROL
Number dead	5	5	7	65	all	all	all	all	all	all	6

(b) *Carbon tetrachloride.*

DOSE	0.010	0.015	0.020	0.025	0.050	0.075	0.100	0.125	0.150	0.175	CONTROL
Number dead	2	5	9	4	30	94	all	all	all	all	12

(c) *Methyl salicylate.*

DOSE	0.0025	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250
Number dead	all	all	all	all	all	all	all

DOSE	0.0500	0.0750	0.1000	0.1250	0.1500	0.1750	CONTROL
Number dead	all	all	all	all	all	all	5

The following tables show the effect of fumigation on hypopi of *Glyciphagus domesticus* with Carbon tetrachloride and with Methyl salicylate under different conditions of temperature and humidity. These results are due to Miss A.M. Hora and have been published in *Annals Appl. Biol.*, 1934, 21, 483. They were obtained with the assistance of one of the Authors and are reprinted here for the sake of Completeness.

(a) Carbon tetrachloride at 20° C. and 80 % relative humidity, exposure 18 hours, number in each experiment 50 and in control 50.

DOSE ccs per lit.	0.1	0.2	0.3	0.4	0.5
Number of Nymphs emerged	13	5	none	none	none
CONTROL	44 emerged				

(b) Carbon tetrachloride at 20° C. and 76 % relative humidity, exposure 25 hours, number used in each experiment and in control 50.

DOSE ccs per lit.	0.1	0.2	0.3	0.4
Number of Nymphs emerged	none	none	none	none
CONTROL	42 emerged			

(c) Methyl salicylate at 20° C. and 76 % relative humidity, exposure 25 hours, number used in each experiment and in control 50.

DOSE ccs per lit.	0.02	0.04	0.07	0.10
Number of Nymphs emerged	none	none	none	none
CONTROL	42 emerged			

2. Against Ephestia kuhniella. — all stages.

(a) Eggs

Fumigant	Dose ccs per lit.	Hatched	Not hatched	% dead	Corrected % Dead
Trichlorethylene	0.0250	63	0	0	0
	0.0500	45	15	25	25
	0.0750	0	60	100	100
	0.1000	0	60	100	100
Carbon tetrachloride ..	0.0500	2	58	97	97
	0.0750	0	60	100	100
	0.1000	0	60	100	100
	0.1250	0	60	100	100
Methyl salicylate	0.0025	20	40	67	67
	0.0050	1	59	98	98
	0.0075	6	54	90	90
	0 0100	4	54	90	90
CONTROL	—	250	0	0	—

(b) Larvae

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	22	6	2	—	7	—
	0.0500	8	—	—	22	73	60.8
	0.0750	6	—	2	22	80	70.5
	0.1000	—	1	—	29	97	95.0
Carbon tetrachloride .	0.0500	4	1	3	22	83	75.5
	0.0750	5	2	1	22	77	65.7
	0.1000	4	4	3	19	73	60.8
	0.1250	—	1	—	29	97	95.0
Methyl salicylate	0.0025	28	—	2	—	7	—
	0.0050	27	2	1	—	3	—
	0.0075	28	—	—	2	7	—
	0.0100	30	—	—	—	0	0
CONTROL	—	68	—	—	32	32	—

(c) Pupae

Fumigant	Dose	Emerged	Not emerged	% Dead	Correeted % dead
Trichlorethylene	0 0250	24	6	20	20
	0.0500	13	17	57	57
	0.0750	2	28	93	93
	0.1000	2	28	93	93
Carbon tetrachloride ..	0.0500	22	8	27	27
	0.0750	20	10	33	33
	0.1000	7	23	77	77
	0.1250	5	25	83	83
Methyl salicylate	0.0025	24	6	20	20
	0.0050	29	1	3	3
	0.0075	30	0	0	0
	0.0100	27	3	10	10
CONTROL	— —	200	0	0	— —

(d) Adults

Fumigant	Dose	Alive	Slightly affected	Mori-bund	Dead	% Dead	Corrected % dead
Trichlorethylene	0.0250	22	—	—	8	27	13
	0.0500	—	1	1	28	97	96
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	—	2	—	28	93	92
	0.0750	—	3	—	27	90	88
	0.1000	—	—	2	28	100	100
	0 1250	—	—	1	29	100	100
Methyl salicylate	0.0025	5	—	2	23	83	72
	0.0050	—	—	—	30	100	100
	0.0075	—	—	—	30	100	100
	0.0100	—	—	—	30	100	100
CONTROL	— —	101	—	—	19	16	— —

3. Against Sitotroga cerealella.

(a) In a mite infested culture on barley about 200 ccs bulk.

Fumigant	Dose	Mites alive	Moths emerging (after one week)
Trichlorethylene	0.0250	few	Over 100
	0.0500	none	»
	0.0750	»	»
	0.1000	»	about 40
Carbon tetrachloride	0.0500	few	over 100
	0.0750	none	»
	0.1000	»	»
	0.1250	»	about 30
Methyl salicylate	0.0025	few	over 100
	0.0050	none	»
	0.0075	»	»
	0.0100	»	»

(b) Eggs

Fumigant	Dose	Hatched	Not hatched	% Dead	Corrected % dead
Trichlorethylene	0.0250	42	58	58	50
	0.0500	36	64	64	57
	0.0750	3	97	97	96
	0.1000	0	100	100	100
Carbon tetrachloride....	0.0500	19	81	81	77
	0.0750	29	71	71	65
	0.1000	14	86	86	83
	0.1250	44	56	56	47
Methyl salicylate	0.0025	38	62	62	54
	0.0050	68	32	32	18
	0.0075	35	65	65	58
	0.0100	28	72	72	66
CONTROL	— —	100	20	16.7	— —

4. Against Trogoderma granarium. — Larvae and adults.

(a) Larvae

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % dead
Trichlorethylene	0.0250	30	—	—	—	—	—
	0 0500	27	—	—	3	10	5
	0.0750	23	4	1	2	10	5
	0.1000	—	—	28	2	100	100
Carbon tetrachloride....	0.0500	25	—	—	5	17	12
	0.0750	—	—	27	3	100	100
	0.1000	2	—	25	3	93	93
	0.1250	14	—	—	16	53	51
Methyl salicylate	0.0025	30	—	—	4	13	8
	0.0050	25	1	—	2	7	2
	0.0075	28	—	—	4	13	8
	0,0100	26	—	—	6	20	15
CONTROL	— —	107	—	—	6	5	—

(b) Adults

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % dead
Trichlorethylene	0.0250	20	--	—	10	33	7
	0.0500	25	—	—	5	17	—
	0.0750	14	—	—	16	53	35
	0.1000	2	—	—	28	93	90
Carbon tetrachloride....	0.0500	5	—	—	25	83	77
	0.0750	—	—	4	26	100	100
	0.1000	—	--	2	28	100	100
	0.1250	5	—	2	23	83	77
Methyl salicylate	0.0025	27	—	—	3	10	—
	0.0050	28	—	—	2	7	—
	0.0075	29	—	—	1	3	—
	0.0100	27	—	—	3	10	—
CONTROL	—	93	—	—	37	28	—

5. Against Rhizopertha dominica. — Adults.

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	6	—	—	14	70	63
	0.0500	—	—	—	20	100	100
	0.0750	—	—	—	20	100	100
	0.1000	—	—	—	20	100	100
Carbon tetrachloride....	0.0500	1	—	—	19	95	94
	0.0750	—	—	—	20	100	100
	0.1000	—	—	—	20	100	100
	0.1250	—	—	—	20	100	100
Methyl salicylate	0.0025	—	—	—	20	100	100
	0.0050	—	—	—	20	100	100
	0.0075	—	—	—	20	100	100
	0.0100	—	—	—	20	100	100
CONTROL	—	165	—	—	35	17.5	—

6. Against Gnathocerus cornutus. — Larvae and adults.

(a) Larvae

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	1	1	—	28	93	90
	0.0500	1	—	—	29	97	95
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	3	—	—	27	90	85
	0.0750	4	—	—	26	87	80
	0.1000	1	—	—	29	97	95
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	19	—	—	11	37	7
	0.0050	18	—	—	12	40	12
	0.0075	9	—	—	21	70	56
	0.0100	6	—	—	24	80	70.5
CONTROL	—	108	—	—	50	32	—

(b) Adults

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	3	—	4	23	90	89
	0.0500	—	—	—	30	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	—	—	—	30	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	27	—	—	3	10	3
	0.0050	26	1	—	3	10	3
	0.0075	28	1	—	1	3	—
	0.0100	28	—	—	2	7	—
CONTROL	—	164	—	—	11	6	—

7. Against Tribolium castaneum. — Larvae and adults.

(a) Larvae

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	10	12	1	7	27	10
	0.0500	6	8	6	10	53	42
	0.0750	—	7	12	11	77	71
	0.1000	—	5	8	17	83	79
Carbon tetrachloride...	0.0500	3	16	—	11	37	22
	0.0750	4	10	9	7	53	43
	0.1000	1	3	13	13	87	83
	0.1250	—	2	13	15	93	91
Methyl salicylate	0.0025	27	2	—	1	3	—
	0.0050	26	—	—	4	13	—
	0.0075	25	—	—	5	17	—
	0.0100	24	—	1	5	17	1
CONTROL	—	163	—	—	37	19	—

(b) Adults

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	10	—	—	20	73	72
	0.0500	—	—	—	30	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	2	—	—	28	93	93
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	25	3	—	2	7	4
	0.0050	27	—	—	3	10	7.5
	0.0075	20	—	—	10	33	31
	0.0100	22	—	1	7	27	24
CONTROL	—	251	—	—	7	2.7	—

8. Against Tenebrio molitor. — Adults (Number of insects 20).

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	10	—	—	10	50	42
	0.0500	4	—	—	16	80	76
	0.0750	—	—	—	20	100	100
	0.1000	—	—	—	20	100	100
Carbon tetrachloride....	0.0500	—	—	—	20	100	100
	0.0750	—	—	—	20	100	100
	0.1000	—	—	—	20	100	100
	0.1250	—	—	—	20	100	100
Methyl salicylate	0.0025	17	—	—	3	15	1
	0.0050	13	—	—	7	35	24
	0.0075	16	—	—	4	20	7
	0.0100	17	—	—	3	15	1
CONTROL	—	86	—	—	14	14	—

9. Against Sitophilus granarius L. — Adults.

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	14	—	—	16	53	50
	0.0500	—	—	12	18	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	1	29	100	100
Carbon tetrachloride....	0.0500	—	—	6	24	100	100
	0.0750	—	—	7	23	100	100
	0.1000	—	—	4	26	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	27	—	—	3	10	3
	0.0050	27	—	—	3	10	3
	0.0075	18	—	—	15	40	36
	0.0100	27	—	—	3	10	3
CONTROL	—	187	—	—	13	6.5	—

10. Against Caulophilus latinasus S. — Adults.

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	6	—	—	24	80	75
	0.0500	4	—	4	22	87	83
	0.0750	—	—	—	30	100	100
	0.1000	—	—	1	29	100	100
Carbon tetrachloride....	0.0500	—	—	—	30	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	20	—	—	10	33	16
	0.0050	20	—	3	7	33	16
	0.0075	18	—	2	10	40	25
	0.0100	8	—	2	20	73	66
CONTROL	—	160	—	—	40	20	—

11. Against Sitodrepa panicea L. — Larvae and adults.

(a) Larvae

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	15	6	2	7	30	5.4
	0.0500	5	2	3	20	77	68
	0.0750	8	5	—	17	57	41
	0.1000	2	—	13	15	93	91
Carbon tetrachloride....	0.0500	19	—	—	11	37	14
	0.0750	16	—	—	14	47	28
	0.1000	17	2	3	10	43	23
	0.1250	14	—	—	16	53	37
Methyl salicylate	0.0025	11	—	6	3	30	54
	0.0050	5	4	3	18	70	60
	0.0075	9	—	6	15	70	60
	0.0100	3	—	7	20	90	86
CONTROL	—	74	—	—	26	26	—

(b) Adults

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	—	—	1	29	100	100
	0.0500	—	—	—	30	100	100
	0.0750	—		—	30	100	100
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	—	—	—	30	100	100
	0.0750	—	1	2	27	97	94
	0.1000	—	—	—	30	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	18	—	—	12	40	—
	0.0050	18	—	—	12	90	—
	0.0075	3	—	1	26	70	82
	0.0100	9	—	2	19	70	45
CONTROL	—	109	—	—	91	45.5	—

12. Against Silvanus mercator. — Larvae and adults.

(a) Larvae

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	4	—	—	26	87	78
	0.0500	—	—	—	30	100	100
	0.0750	1	—	—	29	97	94
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	—	—	—	30	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	6	—	—	24	80	67
	0.0050	7	—	—	23	77	61
	0.0075	6	—	—	24	80	67
	0.1000	8	—	—	22	77	56
CONTROL	—	60	—	—	40	40	—

(b) Adults

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	8	—	7	15	73	57
	0.0500	—	—	—	30	100	100
	0.0750	1	—	—	29	97	94
	0.1000	1	—	—	29	97	94
Carbon tetrachloride....	0.0500	2	—	—	28	93	89
	0.0750	—	—	2	28	100	100
	0.1000	—	—	—	30	100	100
	0.1250	—	—	2	28	100	100
Methyl salicylate	0.0025	29	—	—	1	3	—
	0.0050	17	—	—	13	43	9
	0.0075	25	—	—	5	17	—
	0.0100	19	—	—	11	37	
CONTROL	—	62	—	—	38	38	—

13. Against Cryptophagus sp. — Adults.

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	—	—	—	30	100	100
	0.0500	—	—	—	30	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	—	—	—	30	100	100
	0.0750	—	—	—	30	100	100
	0.1000	—	—	—	30	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	17	—	—	13	43	25
	0.0050	6	—	—	24	80	74
	0.0075	16	—	—	14	47	30
	0.0100	10	—	—	20	67	56
CONTROL	—	151	—	—	49	24	—

14. Against Carpophilus dimidiatus (Fab.) Larvae and adults.

(a) Larvae

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	14	9	2	5	23	13
	0.0500	11	5	4	10	47	43
	0.0750	4	8	10	8	60	54
	0.1000	3	10	3	14	57	50
Carbon tetrachloride....	0.0500	23	3	—	4	13	2
	0.0750	8	10	2	10	40	32
	0.1000	6	11	8	5	43	36
	0 1250	4	13	7	6	43	36
Methyl salicylate	0.0025	30	—	—	—	—	—
	0.0050	29	—	—	1	3	—
	0.0075	29	—	—	1	3	—
	0.0100	28	—	—	2	7	—
CONTROL	—	177	—	—	23	11.5	—

(b) Adults

Fumigant	Dose	Alive	Slightly affected	Moribund	Dead	% Dead	Corrected % Dead
Trichlorethylene	0.0250	25	1	—	4	13	4
	0.0500	11	—	2	17	63	60
	0.0750	—	—	7	23	100	100
	0.1000	—	—	—	30	100	100
Carbon tetrachloride....	0.0500	—	—	—	30	100	100
	0.0750	—	—	2	28	100	100
	0.1000	—	—	—	30	100	100
	0.1250	—	—	—	30	100	100
Methyl salicylate	0.0025	27	1	—	2	7	—
	0.0050	28	—	—	2	7	—
	0.0075	26	—	—	4	13	4
	0.0100	28	—	—	2	7	—
CONTROL	—	150	—	—	17	10	—

Experiments with Fungus Cultures.

A. — At room temperature (17-19° C.) and humidity exposure of infested cultures of the following groups:—

Aspergillus flavus, *tamarii*, *terrens*, *fumigatus*, *niger*, and *Syncephalastrum cinerea* — to carbon tetrachloride at a concentration of 0.5 cc. per litre for 24 hours killed the mites but left the cultures unaffected.

Exposure to Trichlorethylene for 24 hours at a concentration of 0.25 cc. per litre gave the same result.

These concentrations are far higher than those which gave complete control of mites.

B. — At 25° C. and 80 % relative humidity, exposure 24 hours. Concentrations in ccs of liquid per litre. After treatment every culture was subcultured on a fresh tube of the same media and all were incubated at 23.5° C. They were then examined and new growth recorded.

1. — Trichlorethylene.

(a) Effect on Culture

Name of Fungus	DOSE CCS PER LITRE							
	0.0250	0.0500	0.0750	0.1500	0.2250	0.3000	0.4500	Control
Cladosporium herbarum	G	G	G	G	G	G	G	G
Botrytis cinerea	»	»	»	»	»	P. A.	P. A.	G
Fusarium sp.	»	»	»	P. A.	P. A.	P. A	P. A.	G
Phoma sp.	»	»	»	G	G	G	G	G
Mucor racemosus	»	»	»	»	»	»	»	G
Sporotrichum carnis	»	»	»	»	»	»	»	G
Trichoderma lignorum ...	»	»	»	»	»	»	»	G
Oidium lactis	»	»	»	»	»	»	»	G
Monilia fructigena	»	»	»	»	P. A.	P. A.	P. A.	G
Scopulariopsis brevicaulis	»	»	»	»	G	G	G	G

G = Good ; P.A. = Partially affected

(b) Effect on Sub-culture

Name of Fungus	DOSE CCS PER LITRE							
	0.0250	0.0500	0.0750	0.1500	0.2250	0.3000	0.4500	Control
Cladosporium herbarum	G	G	G	G	G	G	A	G
Botrytis cinerea	»	»	»	»	»	»	A	G
Fusarium sp.	»	»	»	»	»	»	A	G
Phoma sp.	»	»	»	»	»	»	G	G
Mucor racemosus	»	»	»	»	»	»	»	G
Sporotrichum carnis	»	»	»	»	»	»	»	G
Trichoderma lignorum ...	»	»	»	»	»	»	»	G
Oidium lactis	»	»	»	»	»	»	»	G
Monilia fructigena	»	»	»	»	A	A	A	G
Scopulariopsis brevicaulis	»	»	»	»	G	G	G	G

G = Good ; A = Affected

2. — Carbon tetrachloride

(a) Effect on Culture

Name of Fungus	DOSE CCS PER LITRE								Control
	0.0500	0.0750	0.1000	0·1250	0.2000	0.3000	0.4000	0.6000	
Cladosporium herbarum	G	G	G	G	G	G	G	G	G
Botrytis cinerea	»	»	»	»	P A.	»	—	P.A.	G
Fusarium sp.	»	»	»	»	»	P.A.	P.A.	G	G
Phoma sp.	»	»	»	»	G	G	G	»	G
Mucor racemosus	»	»	»	»	»	P.A.	»	»	G
Sporotrichum carnis	»	»	»	»	»	G	»	»	G
Trichoderma lignorum ...	»	»	»	»	»	»	»	»	G
Oidium lactis	»	»	»	»	P.A.	»	»	»	G
Monilia fructigena	»	»	»	»	P.A.	P.A.	—	P.A.	G
Scopulariopsis brevicaulis	»	»	»	»	G	G	G	G	G

G = Good ; P.A. = Partially affected

(b) Effect on Sub-culture

Name of Fungus	DOSE CCS PER LITRE								Control
	0.0500	0.0500	0.1000	0.1250	0.2000	0.3000	0.4000	0.6000	
Cladosporium herbarum	G	G	G	G	G	G	G	G	G
Botrytis cinerea	»	»	»	»	»	»	—	—	G
Fusarium sp.	G	G	G	G	G	G	G	G	G
Phoma sp.	»	»	»	»	»	»	»	»	G
Mucor racemosus	»	»	»	»	»	»	»	»	G
Sporotrichum carnis	»	»	»	»	»	»	»	»	G
Trichoderma lignorum ...	»	»	»	»	»	»	»	»	G
Oidium lactis	»	»	»	»	»	»	»	»	G
Monilia fructigena	»	»	»	»	»	—	—	—	G
Scopulariopsis brevicaulis	»	»	»	»	»	G	G	G	G

G = Good

3. — Methyl salicylate

(a) Effect on Culture

Name of Fungus	DOSE CCS PER LITRE								Control
	0.0025	0.0050	0.0075	0.0100	0.0150	0.0250	0.0300	0.0450	
Cladosporium herbarum	G	G	G	G	G	G	G	G	G
Botrytis cinerea	»	»	»	»	»	»	P.A.	P.A.	G
Fusarium sp.	»	»	»	»	»	»	»	»	G
Phoma sp.	»	»	»	»	»	»	G	G	G
Mucor racemosus	»	»	»	»	»	»	P.A.	P.A.	G
Sporotrichum carnis	»	»	»	»	»	»	G	G	G
Trichoderma lignorum ...	»	»	»	»	»	»	»	»	G
Oidium lactis	»	»	»	»	»	»	P.A.	»	G
Monilia fructigena	»	»	»	»	»	»	»	—	G
Scopulariopsis brevicaulis	»	»	»	»	»	»	G	G	G

G = Good ; P.A. = Partially affected

(b) Effect on Sub-culture

Name of Fungus	DOSE CCS PER LITRE								Control
	0.0025	0.0050	0.0075	0.0100	0.0150	0.0250	0.0300	0.0450	
Cladosporium herbarum	G	G	G	G	G	G	G	G	G
Botrytis cinerea	»	»	»	»	»	»	»	»	G
Fusarium sp.	»	»	»	»	»	»	»	»	G
Phoma sp.	»	»	»	»	»	»	»	»	G
Mucor racemosus	»	»	»	»	»	»	»	»	G
Sporotrichum carnis	»	»	»	»	»	»	»	»	G
Trichoderma lignorum ...	»	»	»	»	»	»	»	»	G
Oidium lactis	»	»	»	»	»	»	»	—	G
Monilia fructigena	»	»	»	»	»	»	»	G	G
Scopulariopsis brevicaulis	»	»	»	»	»	»	»	»	G

G = Good

The *Monilia fructigena* appeared to be the most sensitive of all the cultures used, to the above fumigants.

Summary and Conclusion.

Insect and Fungus cultures can be freed from mites by chemical means without, or with slight effect on the cultures.

Ammonia and pyridine at a concentration which killed mites also killed the insects. The odours of the latter are rather persistant in the food of insects.

Trichlorethylene, Carbon tetrachloride, and Methyl salicylate proved to be fatal, but saved the fungus and insects cultures at the concentrations which killed the mites.

The above three chemicals have been tried at constant temperature and constant humidity and at ordinary room conditions, against mites and the concentrations which killed the mites were tried at the same conditions against different stages of stored-products and fungus cultures; and they responded differently to the above three compounds.

Infested grain containing mites (all stages), and all stages of *Sitotroga* treated with Trichlorethylene at room temperature, at a dose of 0.225 ccs per litre for 25 hours killed the mites with slight effect on the insects. Treating *Tribolium* on flour and *Calandra* on grain for 4 hours at room temperature (22° C) with a dose of 0.150 - 0.225 ccs per litre freed the cultures from mites and saved a good number of insects.

Mites (nymphs and adults) treated with Carbon tetrachloride at room temperature (22 - 24° C), With a dose of 0.250 - 0.500 ccs per litre were all killed in 4 hours.

A dose of 0.250 ccs per litre at room temperature (19° C.) killed all *Tribolium* adults, but some of the larvae survived when treated with a dose of 0.325 - 0.450 ccs per litre for 4 hours at room temperature (20° C.).

Trichlorethylene and Carbon tetrachloride proved fatal to all stages of *Ephestia kühniella* at concentrations which are not fatal to mites.

At constant temperature (25° C.), and constant humidity (80 %), and 24 hours exposure, Trichlorethylene killed all stages of mites at a concentration of 0.050 - 0.175 ccs per litre. Carbon tetrachloride gave the same result at a concentration of 0.100 - 0.175 ccs per litre, and Methyl salicylate at a concentration of 0.0025 - 0.1750 ccs per litre.

When tried against insects at the same conditions of temperature, humidity, and time of exposure, They acted differently according to the following :—

INSECTS	TRICHLORETHYLENE		CARBON TETRACHLORIDE		MEHTYL SALICYLATE	
	Dose ccs/ltr.	% Survivals	Dose ccs/ltr.	% Survivals	Dose ccs/ltr.	% Survivals
Ephestia kühniella eggs	0.0250	all	0.0500	3	0.0025	33
	0.0500	50	—	—	—	—
Ephestia kühniella larvae	0.0250	all	0.0500 -0.1000	25	0.0025 -0.0100	all
	0.0500	40	—	—	—	—
	0.0750	30	—	—	—	—
Ephestia pupae	0.0250	80	0.0500 -0.0750	70	0.0025 -0.0075	80
	0.0500	43	0.1000	23	—	—
Ephestia adults	0.0 50	80	0.0500	8	0.0025	25
Sitotroga cerealella on Barley : different Stages	0.0250 -0.0750	over 100 months emerged	0.0500 -0.1000	over 100 months emerged	0.0025 -0.0100	over 100 months emerged
	0.1000	about 40 emerged	0.1250	about 30 emerged	—	—
Sitotroga eggs	0.0250 -0.0500	50	0.0500 -0.0750	25	0.0025 -0.0075	50
Trogoderma granarium adults	0.0250 -0.0750	over 95	0.0500	23	0.0025 -0.0100	all
Rhizopertha dominica adults	0.0250	23	all conc.	none	all conc.	none
Gnathocerus cornutus larvae	0.0250	10	0.0500 -0.0750	20	0.0025 -0.0050	85
					0.0100	30
Gnathocerus adults	0.0250	10	all conc.	none	0.0025 -0.0100	most
Tribolium castaneum larvae	0.0250	90	0.0500 -0.0750	70	0.0025 -0.0100	all
	0.0500	58	0.1000	20	—	—
	0.7500	30	—	—	—	—
Tribolium adults	0.0250	28	0.0500	7	0.0025 -0.0100	75
Tenebrio molitor adults	0.0250	58	all conc.	none	0.0025 -0.0100	99-75
	0.0500	25	—	—	—	—
Sitophilus granarius adults	0.0250	50	all conc.	none	0.0025 -0.0100	97-74

INSECTS	TRICHLORETHYLENE		CARBON TETRACHLORIDE		METHYL SALICYLATE	
	Dose ccs ltr.	% Survivals	Dose ccs/ltr.	% Survivals	Dose ccs/ltr.	% Survivals
Caulophilus latinasus adults	0.0250	25	all conc.	none	0.0025 -0.0075	84-75
	0.0500	17	—	—	0.0100	34
Sitodrepa panicea larvae	0.0250	94.6	0.0500 -0.1250	86-63	0.0025 -0.0100	46-14
	0.0500 -0.1000	59-10	—	—	—	—
Sitodrepa adults	all conc.	none	all conc.	few	0.0025 -0.0500	most
Silvanus mercator larvae	0.0250	22	all conc.	none	0.0025 -0.0075	30
Silvanus adults	0.0250	63	0.0500	11	0 0025 -0.0100	most
Cryptophagus sp. adults	all conc.	none	all conc.	none	0.0025 -0.0100	75-26
Carpophilus dimidiatus larvae	0.0250 -0.1000	80-50	0.0500 -0.1250	98-64	0.0025 -0.0100	most
Carpophilus adults	0.0250 -0.0500	96-4	all conc.	none	0.0025 -0.0100	most

Fungus cultures:

Aspergillus flavus, *A. tamarii*, *A. terrens*, *A. fumigatus*, *A. niger* and *Syncephalastrum cinerea*, were fumigated at room temperature (17-19° C.) and humidity; exposure 24 hours. They were then sub-cultured and incubated at a temperature of 23.5° C.

Trichlorethylene at a dose of 0.2500 ccs per litre and Carbon tetrachloride at a dose of 0.500 ccs per litre did not damage the cultures and the sub-cultures continued growth.

At 25° C., 80 % R. humidity, and exposure 24 hours, another 10 cultures were fumigated, sub-cultured, and incubated at 23.5° C. Doses which killed the mites, were quite safe to the following cultures:

Cladosporium herbarum, *Botrytis cinerea*, *Fusarium* sp., *Phoma* sp., *Mucor racemosus*, *Sporotrichum carnis*, *Trichoderma lignorum*, *Oidium lactis*, *Monilia fructigena*, and *Scopulariopis brevicaulis*.

At concentrations of 0.0250-0.4500 ccs per litre of Trichlorethylene most of the cultures and sub-cultures survived.

Nearly the same result was obtained with Carbon tetrachloride at a con-

centration of 0.0500 - 0.6000 ccs per litre and of Methyl salicylate at a concentration of 0.0025 - 0.0450 ccs per litre.

We wish to express our thanks to Mr. Herford and Mr. Mansbridge of the Imperial College of Science and Technology Biological Field Station at Slough for supplying us with the Insect and Mites material for our experimental work and to Mr. Ayre and Mr. Vernon for supplying us with the Fungus Cultures, and to Professor J.W. Munro for his encouragement during the course of work.

Alcune specie di *Empoasca* viventi in Egitto

(Hemiptera-Homoptera)

(con 4 Figure nel Testo)

di Guido Paoli

In una nota pubblicata nel 1932 citai la *Empoasca decipiens* Paoli come vivente in Egitto e precisamente a Kafr Hachiw (*recte* Kafr Hakim) su Ricino e Cotone, e a Mansouriah e Abu Ravash su Trifoglio (Barseem); gli esemplari mi furono inviati dal compianto Adolf Andres del Ministero di Agricoltura dell'Egitto.

In seguito il Prof. Dr. H. Priesner, direttore del Servizio di difesa delle piante del Ministero dell'Agricoltura dell'Egitto mi mandò una vistosa collezione di *Empoasca* per la determinazione; gli esprimo i miei vivi ringraziamenti per il cortese invio, per il quale ci è dato conoscere con precisa determinazione una parte almeno delle specie colà viventi.

La collezione comprende molti esemplari provenienti dal Basso Egitto e pochi dell'Alto Egitto, raccolti su piante coltivate diverse; soltanto pochi esemplari non portano l'indicazione della pianta ospite.

La fauna delle *Empoasca* di Egitto, da quello che risulta dalla collezione, è rappresentata da sole cinque specie; quattro delle quali vi sono rappresentate con individui dei due sessi e sono perciò sicuramente determinabili: della quinta vi è soltanto una femmina, che tuttavia pei caratteri delle ali è abbastanza riconoscibile; si tratta probabilmente di una specie nuova, ma per la mancanza del maschio mi astengo da darne per ora la diagnosi.

Nonostante il limitato numero di specie, questo elenco risulta interessante, sia perchè esse provengono da diverse località, sia perchè raccolte su una quantità considerevole di piante.

Faccio pertanto seguire l'elenco delle specie colle complete indicazioni della località, delle piante su cui furono raccolte, della data e del nome del raccoglitore; i numeri fra parentesi si riferiscono a quelli di un mio registro e son stati aggiunti anche agli esemplari della collezione.

1. Empoasca decipiens Paoli (Fig. 1)

Su Trifoglio « Barseem »: Helwan (60) 9.11.29; 19, 28.12.29; (73) Abu Ravash 6, 16.3.30; (74) 19, 26.11.29; 3, 14, 21, 24, 31.12.29; 1, 4.1.30; 8, 11, 16, 25, 29.3.30; Megadlah (78) 1.12.29; Embaba (79) 1.1.30; Kerdasa (82) 26.3.30.

Su Fagioli « Kidney beans »: Mansouriah (70) 14.7.29.

Su Lenticchie « Lentils » : Helwan (67) 16, 18.3.30.

Su Orzo « Barley » : Helwan (63) 13.2.30.

Su Frumento « Wheat » : Nahia (76) 28.3.30.

Su Canna da zucchero « Sugar-cane » : Helwan (59) 16.8.30 ; (80) 12, 26, 30.8.30.

Su Granturco « Maize » : Helwan (68) 5.11.29 ; Abu Ravash (72) 30.6.29 ; Pyramides (77) 5.12.29.

Su Cotone « Cotton » : Kafr Hakim (51) 4.7.29 ; (85) 4.7.29 ; Mansouriah (56) 17.7.29 ; Helwan (84) 16.7.29.

Su Batata « Sweet potatoes » : Helwan (64) 6.7.29.

Su Pomodori « Tomatoes » : Helwan (69) 10, 19, 26, 30.11.29.

Su « *Capparis* spec. » : Helwan (62) 18.2.30.

Senza indicazione di pianta : Kafr Hakim (61) (71) 24.6.31 ; Ibrim (66) 7.4.31 (Leg. Priesner) ; Meadi (88) 21.9.16 (Leg. Adair).

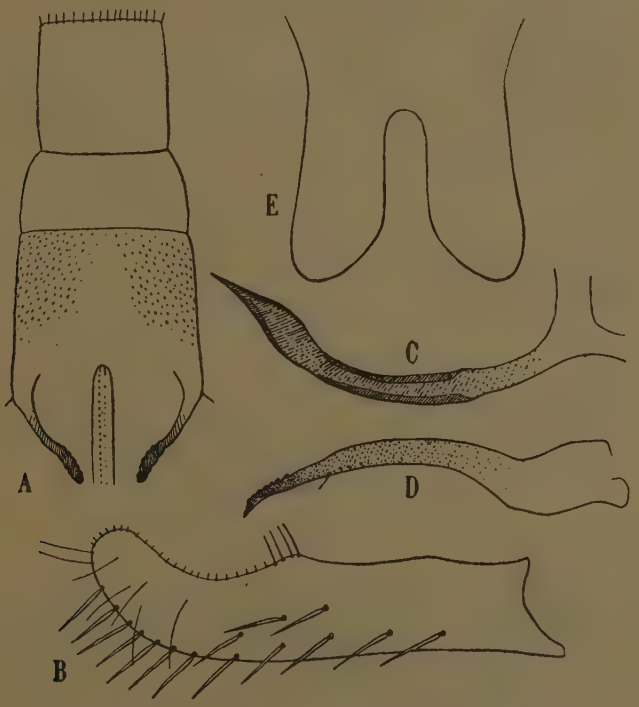

Fig. 1. — Parti dell'estremo addome di maschio di *Empoasca decipiens*; *A*, tubo anale, visto dal ventre, colla porzione terminale del pene ed i processi del tubo anale; *B*, lamina genitale; *C*, stilo superiore; *D*, stilo inferiore; *E*, lobi dell'apodema addominale.

Osservazioni. — E' la specie più comune in Egitto; essa è molto diffusa e comune anche in Italia su diverse piante (Vite, Fagioli, *Helianthus*, Ricino, Pomodoro, Patate, Bietole, Querce); non risulta che finora fosse stata trovata in altre regioni; la sua presenza e abbondanza in Egitto fa supporre che sia diffusa nel bacino del Mediterraneo.

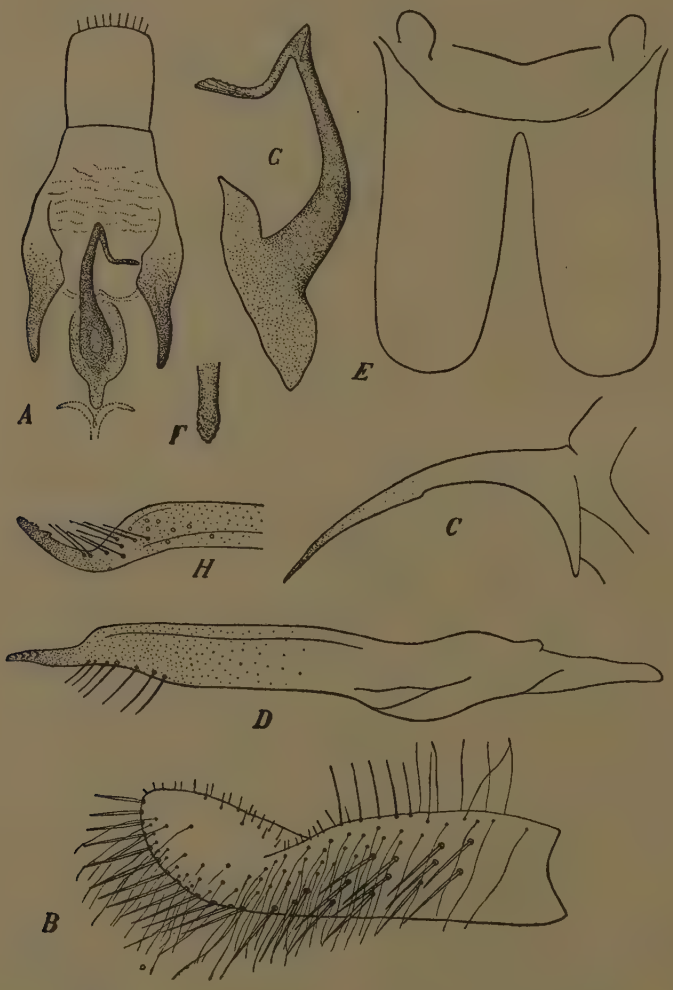

Fig. 2. — Parti dell'estremo addome di maschio di *Empoasca decedens*; *F*, estremità del processo del tubo anale; *G*, pene; *H*, estremità dello stilo inferiore, vista di lato; le altre lettere come a Figura precedente.

2. Empoasca decedens Paoli (Fig. 2)

Su Cotone « Cotton » : Giza (53) 20.7.30 (Leg. Kasim) ; (54) 12.7.30 (Leg. Kasim) ; (57) 26, 29.7.30 (Leg. Kasim) ; (58) 29.6.30 (Leg. Kasim).

Su Agrumi « Citrus » : Mehalla el Kobra (81) 9.1.32 (Leg. Husny).

Osservazioni. — Anche questa specie era nota finora soltanto per l'Italia, ove era stata raccolta su Fagioli, Ricino, Melanzane, Viti e Barbabietole.

3. Empoasca libyca de Berg. (Fig. 3)

Su Cotone « Cotton » : Giza (52) 30.8.30 (Leg. Kasim).

Su Canna da zucchero « Sugar-cane » : Helwan (59 bis) 16.8.30.

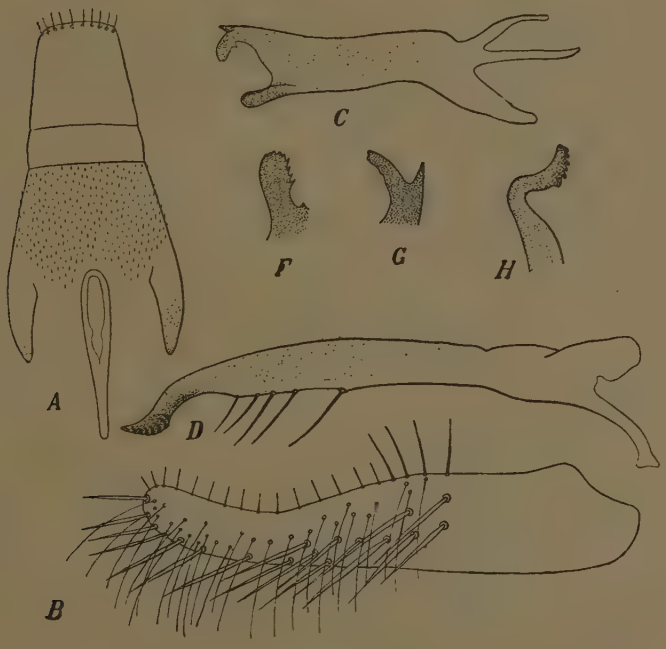

Fig. 3. — Parti dell'estremo addome di maschio di *Empoasca lybica; F*, lobo esterno apicale dello stilo superiore e *G*, lobo interno, veduti obliquamente; *H*, estremità dello stilo inferiore, veduta di fianco; le altre lettere come a Fig. 1.

Osservazioni. — Questa specie da me descritta nel 1932 col nome di *E. benedettoi* ha una larga distribuzione geografica ; essa infatti si trova anche nel territorio del Tanganyika, nella Somalia italiana meridionale, nell'Eritrea, nel Sudan Anglo-egiziano, in Cirenaica, in Tunisia e in Spagna.

In Tanganyika, Somalia e Sudan la specie è stata raccolta su Cotone,

come in Egitto; in Cirenaica e in Spagna sulla vite; in Eritrea e in Tunisia su piante indeterminate. Per la Somalia il Russo (1934) la cita anche per il Ricino ed il Girasole (*Helianthus annuus*).

4. Empoasca distinguenda Paoli (Fig. 4)

Su Ricino « Castor oil »: Ashmant (87) 8.10.17 (Leg. Gibson).

Osservazioni. — La specie era nota finora soltanto dell'Africa a sud dell'equatore, essendo stata trovata nel Transvaal e nel Congo belga; finora era stata raccolta sul Cotone, sul Granturco e su *Phaseolus* (« Tepari beans »).

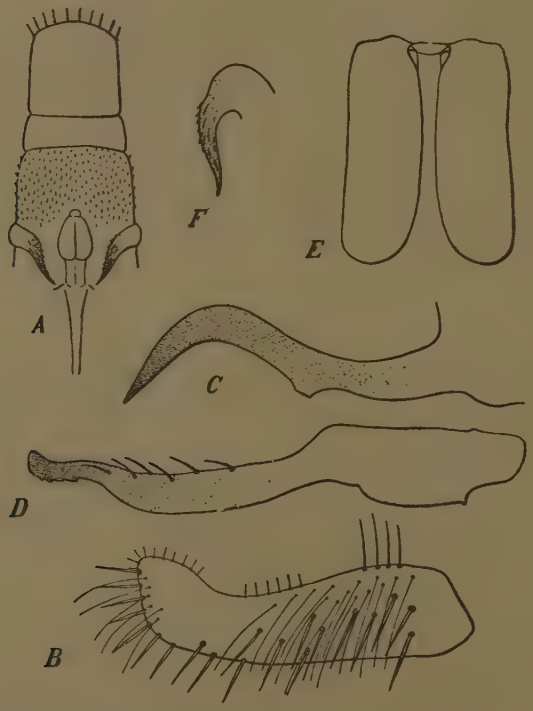

Fig. 4. — Parti dell'estremo addome di maschio di *Empoasca distinguenda; F*, processo del tubo anale; le altre lettere come a Fig. 1.

Allo scopo di fare meglio rilevare la distribuzione delle diverse specie in Egitto, faccio seguire l'elenco di quelle raccolte per ogni località.

Regione del Delta:

Mehalla el Kobra — *E. decedens* su Citrus.

Dintorni del Cairo:

Embaba: *E. decipiens* su Barseem.
Meadi: *E. decipiens* su ?
Giza: *E. decedens* su Cotone, *E. libyca* su Cotone.
Mansouriah: *E. decipiens* su Cotone e Fagioli.
Kafr Hakim: *E. decipiens* su Cotone e Ricino.
Abu Ravash: *E. decipiens* su Barseem.
Nahia: *E. decipiens* su Frumento.
Pyramids: *E. decipiens* su Granturco.
Megadlah: *E. decipiens* su Barseem.
Kerdasa: *E. decipiens* su Barseem.

Medio Egitto:

Helwan: *E. decipiens* su Canna da zucchero, Avena, Granturco, *Capparis* spec., Barseem, Lenticchie, Fagioli, Cotone, Batata, Pomodori; *E. libyca* su Canna da zucchero.
Ashmant: *E. distinguenda* su Ricino.

Alto Egitto:

Ibrim: *E. decipiens* su ?

Credo anche interessante fare seguire l'elenco delle piante colla indicazione della specie di *Empoasca* finora riscontrate in Egitto sulle diverse piante, comprendendo perciò anche quelle pubblicate nel 1932.

Saccharum officinale (Sugar cane): *E. decipiens* (Helwan); *E. libyca* (Helwan).
Zea mais (Maize): *E. decipiens* (Helwan, Abu Ravash, Pyramides).
Avena sativa (Barley): *E. decipiens* (Helwan).
Triticum sp. (Wheat): *E. decipiens* (Nahia).
Ricinus communis (Castor oil plant): *E. decipiens* (Kafr Hakim); *E. distinguenda* (Ashmant).
Lens communis (Lentils): *E. decipiens* (Helwan).
Phaseolus vulgaris (Kidney beans): *E. decipiens* (Mansouriah).
Trifolium alexandrinum (Barseem): *E. decipiens* (Helwan, Megadlah, Embaba, Kerdasa, Mansouriah, Abu Ravash).

Gossypium spp. cultae (Cotton) : *E. decipiens* (Kafr Hakim, Mansouriah, Helwan) ; *E. lybica* (Giza) ; *E. decedens* (Giza).

Citrus sp. : *E. decedens* (Mehalla el Kobra).

Solanum lycopersicum (Tomatoes) : *E. decipiens* (Helwan).

Capparis spec. : *E. decipiens* (Helwan).

Osservazioni di zoogeografia. — Le conoscenze faunistiche relative alle *Empoasca* sono ancora troppo incomplete per poter trarre delle conclusioni zoogeografiche ; tuttavia, se vogliamo dare uno sguardo alla fauna dell'Egitto in base agli elementi oggi noti, possiamo dire che essa è rappresentata da elementi europei ed elementi affricani in eguale misura numerica, ma che la specie, che più abbonda, è veramente europea.

Infatti la *E. decipiens* e la *E.decedens* appartengono alla fauna europea e per l'Affrica sono note finora soltanto per l'Egitto ; la prima di esse sembra avere anche una larga diffusione in Europa e si troverà probabilmente anche in altre regioni mediterranee ; essa è comunissima in Egitto ; la seconda si conosceva finora soltanto dell'Italia, ma in Egitto sembra essere alquanto rara e poco diffusa.

Le altre due specie invece, la *E. libyca* e la *E. distinguenda* sono essenzialmente affricane, benchè la *libyca* arrivi fino alla Spagna ; verso il sud essa sorpassa di poco l'equatore ; la *distinguenda* invece raggiunge il Transvaal, ma sembra che non oltrepassi il Mediterraneo.

Per le altre due specie viventi in Affrica, cioè la *E. facialis* Jac. e la *E. dolichi* Paoli viene confermato il loro carattere di specie meridionali ; nonostante che le piante, su cui vivono siano largamente coltivate anche in Egitto, esse non vi sono state ancora trovate, anzi appaiono limitate al sud del 10° parallelo di latitudine Nord.

Genova,
R. Osservatorio per le malattie delle piante,
10 Marzo 1936, XIV E.F.

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Séance du 10 Juin 1936

Présidence de Monsieur Edgard Chakour.

Zur Kenntnis der Malacodermata Aegyptens

(8. Beitrag zur Kenntnis der palaearktischen Malacodermata)

(Coleoptera-Malachiidae)

von W. Wittmer, Bottmingen/Basel.

Troglops alfierianus Wittm. (*Bull. Soc. Roy. Ent. Egypte*, 1934, p. 450).

Diese Art beschrieb ich nach einem weiblichen Exemplare. Durch das Entgegenkommen von Herrn A. Alfieri, Kairo, bin ich heute in der Lage das Männchen bekanntzugeben.

♂. — Kopf mit den Augen breiter als der Halsschild, breiter als lang. Orangegelb mit je einem schwarzen Flecken auf der Stirn, der sich vom Vorderrand des Halsschildes bis gegen die Augen erstreckt. Zwischen den Augen breit und tief ausgehöhlt. Erhebung der Interokularaushöhlung breit, flach, lamellenartig, in der Mitte ausgerandet, sodass zwei abgerundete Zähne entstehen, die fein abstehend behaart sind. Vorderstirnkiele oben abgeflacht, an der Basis neben den Fühlern breit, gegen die mediane Erhebung verschmälert, hier leicht abfallend und mit ihr bis auf eine seichte Furche verbunden. Zwischen den Kielen breit und tief, vom Clypeus bis zur medianen Erhebung, ausgehöhlt. Die Furche ist etwa 1 1/2 mal länger als breit. Der obere Rand der Interokularaushöhlung ist nicht regelmässig ausgeschnitten, jederseits zeigt sich auf den Seiten, in einer gedachten Linie, von der Spitze des äusseren medianen Zähnchens zum Hinterrande des Auge gezogen, bei der Ansicht von vorne, eine leichte Anschwellung. Fühler lang und schlank, die Mitte der Flügeldecken überragend, braunschwarz, 5-6 Basalglieder gelb, 3. Glied nicht ganz doppelt so lang wie das 2., 4. etwas länger als das 3., die übrigen bis zum 10. in der Länge dem 4. entsprechend, 11. um die Hälfte länger als das 10. Halsschild kaum breiter als lang, vordere 3/4 stark aufgewölbt, die grösste Breit liegt in der vorderen Hälfte, nach hinten stark verengt. Basis und Seiten bis zur Mitte deutlich gerandet, schwarz, Vorder- und Basalrand gelborange. Vollständig glatt, mit Spuren einer spärlichen

Behaarung. Flügeldecken an den Schultern so breit wie der Halsschild, 2 1/2 mal so lang wie breit, nach hinten leicht verbreitert. Schwarz mit leichtem blauem Schimmer, zerstreut punktiert, spärlich behaart. Beine dunkel, mit Ausnahme der Vorderbeine und der Tibien und Tarsen der Mittelbeine, die rotbraun sind. Länge: 2,2 mm.

Fudort: Solloum (Aegypten) 23.3.33 (leg. Dr. H. Priesner), Typus in coll. A. Alfieri, Kairo.

Hypebaeus Alfierii Pic (*Bull. Soc. Ent. Egypte*, 1919, p. 45).

Ist identisch mit *H. Peyerimhoffi* Ab. (*L'Abeille*, Vol. XXXI, 1907, p. 18). Eine grössere Serie *H. Alfierii* Pic, die ich von verschiedenen Wadis des Sinai mitbrachte und die ich mit der Type von *H. Alfierii* Pic (coll. Alfieri) vergleichen konnte, stimmen vollkommen mit ihr überein. Herr P. de Peyerimhoff hatte die Freundlichkeit die ihm eingesandten Stücke von *H. Alfierii* Pic mit der Type des *H. Peyerimhoffi* Ab. zu vergleichen. Er schrieb mir, dass kein Unterschied zwischen den Tieren vom Sinai und denen Aegyptens bestehe, sodass die Synonymie dieser Art entgültig festgelegt ist. Die Arten der Gattung *Hypebaeus* sind in der Färbung Schwankungen unterworfen, die Farbe kann also erst in zweiter Linie als Merkmal zur Abtrennung der einzelnen Arten dienen.

Hypebaeus laterinodosus nov. spec.

Schwarz, Clypeus, Basalglieder der Fühler, Halsschild, Seiten und Spitze der Flügeldecken, sowie Beine gelb oder gelborange.

Kopf mit den Augen fast so breit wie der Halsschild, kaum wahrnehmbar skulptiert, staubartig behaart. Fühler länger als der halbe Körper. Glieder vom 3. bis 10. von wenig unterschiedlicher Länge, nach innen leicht erweitert, 11. Glied so lang wie die beiden vorhergehenden zusammen. Halsschild breiter als lang, alle Ecken verrundet, die grösste Breite liegt in der vorderen Hälfte, sodass der Halsschild nach hinten leicht verengt erscheint. Flügeldecken breiter als der Halsschild, reichlich zweimal so lang als an den Schultern breit, nach hinten leicht erweitert. Die gelbe Färbung der Seiten zieht sich unter den Schultern bis zur Basis hin, vor den Schultern, etwa im ersten Drittel, verbreitert sich die Binde leicht, um sich im zweiten Drittel wieder zu verschmälern. Die Spitzen sind an der Seite breiter, gelb gesäumt als in der Mitte, weil sich hier die dunkle Färbung auf der Naht bis kurz vor die Anhängsel erstreckt. Auf den Seiten, dicht neben den Anhängseln, sind die Decken, ähnlich wie bei *H. flavicollis* Er. höckerförmig aufgewölbt, mit dem Unterschied, dass sie stärker begrenzt, länglich sind und parallel zu den Flügeldecken laufen. Hinter den Beulen sind die Decken leicht der Länge nach eingedrückt. Die Anhängsel sindeinfarbig, gelblich, verkehrt herzförmig, zur Spitze kaum ausgezogen, daselbst eingedrückt. Das Pygidium überragt

die Flügeldecken etwas, ist abgestutzt und stark ausgerandet. Länge: 2 mm.

Fundort: Wadi Luotaie (Sinai) 5.3.1935.

Diese Art kommt auch bei Kairo in den Wadis ob Helwan vor. Ich fing einige Stücke im Wadi Garrawi zusammen mit *H. Peyerimhoffi* Ab. (*Alfieri* Pic), die sich in der Sammlung des Museums Pietro Rossi, Duino, befinden. Die Art scheint viel seltener als *H. Peyerimhoffi* zu sein und ist bisher wohl nur in vereinzelten weiblichen Exemplaren gefangen worden. Ein ♀ aus der Sammlung A. Alfieri mit stark aufgehellten Seiten der Flügeldecken dürfte zu *H. laterinodosus* zu zählen sein.

Verwandt mit *H. flavomarginatus* Pic mit dem er die gelben Seitenbinden der Flügeldecken gemein hat, jedoch kleiner, Kopf schwarz, Anhängsel ohne schwarzen Punkt und ohne Einschnitt an der Spitze. Von *H. Peyerimhoffi* Ab. lässt sich *H. laterinodosus* leicht durch das abgestutzte und ausgeschnittene Pygidium unterscheiden. Die Flügeldecken von *H. Peyerimhoffi* sind nur an der Spitze gelb, die Seiten der Decken neben dem Anhängsel ohne Beule, die Spitze der Decken nicht ausgezogen, der Anhängsel an der Spitze tief ausgeschnitten und an der Basis mit einem stumpfen Zahne versehen. Bei *H. laterinodosus* n.sp. sind die Seiten und Spitzen der Decken gelb, diese neben dem Anhängsel beulenartig aufgewölbt, zur Spitze deutlich ausgezogen, der Anhängsel ist flach, gegen die Spitze eingedrückt.

RISULTATI SCIENTIFICI DELLA SPEDIZIONE DI
S. A. S. IL PRINCIPE ALESSANDRO DELLA TORRE E TASSO
NELL'EGITTO E PENISOLA DEL SINAI

XI.

Formiche

(con Figure 1-12 nel Testo)

di Bruno Finzi.

Ho potuto compilare questo lavoro sulle formiche cacciate dagli amici A. Schatzmayr, K. Koch e W. Wittmer nei loro viaggi in Egitto e penisola del Sinai, grazie alla gentilezza e alla liberalità di S.A.S. il Principe Alessandro della Torre e Tasso, Duca di Castel Duino.

Il materiale, raccolto in un periodo di tempo relativamente breve, si dimostrò di altissimo interesse e le specie nuove per la regione furono tante da invogliarmi a compilare un catalogo ragionato delle formiche conosciute finora dall'Egitto. Il contributo non contempla soltanto le numerose forme affidatemi per la determinazione e che si trovano nelle collezioni del Museo « Pietro Rossi » di Duino, ma anche un piccolo gruppo inviatomi a suo tempo dal defunto A. Andres. Ho distinto nettamente le forme determinate da me, da quelle soltanto riportate, unendo alle prime la citazione delle opere che mi servirono per la determinazione e lasciando senza la stessa quelle determinate da altri Autori. Le forme semplicemente riportate rappresentano però una esigua minoranza.

Di quasi tutti i generi ho compilato una tabella dicotomica delle specie e razze per rendere agevole il loro riconoscimento. Naturalmente non mi sono limitato a fare un semplice elenco delle forme raccolte, ma di ognuna ho dato ampie notizie sistematiche attenendomi ai lavori modernissimi dei molti colleghi con i quali sono in corrispondenza da tanti anni. Ho dovuto rivedere interi generi che attendono tuttora accurato studio ed ho tentato pertanto di fare un lavoro critico. Ho unito infine alcune considerazioni zoogeografiche allo scopo di ricercare le relazioni della fauna mirmecologica egiziana con quella delle regioni vicine.

Le nostre conoscenze sulle formiche egiziane sono per ora discrete; esistono ancora intere zone inesplorate del massimo interesse e che quando sa-

ranno convenientemente studiate accresceranno di certo il numero delle formiche egiziane e specie delle ipogee. Il mio lavoro costituisce pertanto un primo tentativo sintetico di quanto conosciuto finora.

A S.A.S. il Principe Alessandro della Torre e Tasso, magnifico ed insigne mecenale, animatore di questa e tante altre spedizioni entomologiche, va tutta la mia riconoscenza. Agli amici A. Schatzmayr, K. Koch e W. Wittmer del Museo « Pietro Rossi » di Duino, che in tutti i modi mi resero agevole il lungo lavoro di determinazione, va un cordiale ed affettuoso ringraziamento.

I. ELENCO RAGIONATO DELLE FORMICHE EGIZIANE

Subfam. Ponerinae

1. Ponera ragusae var. santschii Emery

Ponera ragusae var. *santschii* Emery, Deutsche Ent. Zeit., 1909, pag. 371.
Ponera ragusae Santschi, Rev. Suisse Zool., 1909, pag. 313.

Riferisco a questa varietà una ♀ dealata di Helouan (2.3.1933). — L'esemplare è uniformemente bruno-piceo, con le rampe, mandibole ed antenne gialle. La squama è piuttosto grossa e della stessa altezza del gastro e del torace. I lati del capo sono quasi paralleli. L. 2,8 mm. Altre tre ♀ ♀ pure dealate di Wadi Halfa (Sudan, 12.2.1933) ed una ♀ di Tor (Sinai, 24.2.33) non mi sembrano affatto differenti da quella raccolta a Helouan. Così pure una serie di ♀ ♀ dealate di Kirdassah, 28.2.1933 e di Barrage, 31.8.1933. Dal Cairo (Piramidi, 2.10.1933) provengono alcune ☿ ☿. Caratteristica in questi esemplari, che sono di color giallo-rossastro, la macchia giallo-chiara sulla fronte, che nelle ♀ ♀ è più o meno marcata. Altre ☿ ☿ di color giallo chiaro vennero raccolte a: Meadi (Cairo), 16.9.1933, a Wadi Digla, 5.9.1933 e a Wadi Feran (Sinai), 4.3.35.

Hab.: Barberia, Egitto, Sinai, Palestina, Siria, Africa orientale.

Subfam. Dorylinae

2. Dorylus fulvus var. punicus (Santschi) Menozzi

Dorylus fulvus var. *punicus* Santschi, Bull. Soc. Hist. Nat. Afrique du Nord, 1936, pag. 231 part.
Dorylus fulvus var. *ruficeps* Santschi, ibidem, pag. 232.

Asyut, 4.2.1933. — Una bella serie di ☿ ☿ di varia grandezza; visto di sopra il capo presenta i lati più o meno paralleli a seconda della grandezza degli esemplari; nei piccoli esso è ristretto posteriormente. Il colore delle ☿ ☿ è giallo uniforme fino a bruno rossiccio. Altre ☿ ☿ di Marsa Matrouh, 19.3.1933, dal Cairo (Sakkarah), 19.2.1933 e di Soloum, 23.3.1933.

Nel suo lavoro sulle formiche palestinesi (1933, pag. 50) C. Menozzi mette in sinonimia la var. *ruficeps* del Libano assegnandola alla var. *punicus* descritta da Santschi su esemplari di Kairouan, Gabes e Gafsa.

Le ☿☿ egiziane appartengono senz'altro alla var. *punicus* nel senso di Menozzi, che a pag. 91 del l.c. la dice diffusa nella « Siria e Palestina ».

Hab.: Egitto, Palestina, Siria.

Subfam. Myrmicinae

3. Sima bifoveolata var. syriaca Wheeler

Sima bifoveolata var. *syriaca* Wheeler, Bull. Mus. Comp. Zool. Harvard, 1916, pag. 167.

Alcune ☿☿ raccolte a Wadi Hebran (Sinai), 6.3.1935. — Gli esemplari sono uniformemente di color giallo carico; soltanto gli ultimi articoli del funicolo sono bruno-gialli, così pure la parte mediana superiore degli ultimi segmenti del gastro. Gli occhi sono grigio-brunastri.

Hab.: Sinai.

4. Messor aegyptiacus Emery

Messor barbarus aegyptiacus Emery, Deutsche Ent. Zeit., 1908, pag. 451.
Messor barbarus subsp. *aegyptiaca* Emery, Gen. Ins., 1921, pag. 70.
Messor aegyptiacus Santschi, Revue Suisse Zool., 1923, pag. 320.
Stenamma (Messor) barbarum var. *aegyptiacum* Mayr, Res. Swed. Zool. Exp., 1903, pag. 6.

Asyut, 31.1.1933. — Le operaie provenienti da questa località sono di color rosso-ruggine col gastro nero; le parti rosse variano però nell'estensione e nell'intensità, essendo di solito il capo di colore più oscuro del torace. La pelosità è assai ridotta; si può dire che il torace e la parte superiore della testa portano una decina di peli o poco più. Il psammoforo è generalmente ben sviluppato. Il primo segmento del gastro è glabro o quasi. Le spine epinotali variano nella grandezza e nella forma, essendo qualche volta ridotte a due sporgenze triangolari. Constato tali variazioni anche in una serie di ☿☿ provenienti dal Cairo (Piramidi), 18.1.1933.

Emery (l.c.) scrive che il gastro è lucente; io lo direi piuttosto sublucido, data la punteggiatura microscopica che copre tutto il tegumento.

Al Cairo vennero raccolte pure alcune ♀♀ dealate ed un ♂. Le ♀♀ si distinguono dalle rispettive operaie per la pelosità gialla sparsa abbondantemente sulla testa e sul torace, più ridotta però sul gastro. La scultura del capo non è « dicht punktiert und nur undeutlich längsgestreift » (Emery, l.c.); i miei esemplari hanno il capo distintamente striato; la striatura occupa anche i lati e raggiunge l'occipite. L'epinoto ha due rilievi più o meno appuntiti.

Due ☿☿ da Meadi (Cairo), 1.7.1933 si distinguono dalla forma tipica per il colorito del torace che è tutto rosso e piuttosto chiaro. La testa è pure rossa con la sua parte anteriore (clipeo e fosse antennali) più brune. Per il colore queste due ☿☿ si avvicinano alla var. *tunetina* Em.

♂. — Nero, coperto di fitta e lunga pubescenza giallastra. Scapo lungo

quanto i primi quattro articoli del funicolo. Capo piuttosto rugoso ed opaco. Scudo del mesonoto leggermente striato e un po' lucido; scutello lucidissimo; epinoto sub-opaco, visto di profilo leggermente arcuato. Peziolo peduncolato; sulla parte superiore ha una protuberanza angolosa; postpeziolo glabro o quasi. Gastro lucido con fitta microscultura.

L. 7 mm., ala anteriore 8 mm.

Hab.: Algeria, Tunisia, Cirenaica, Egitto.

5. Messor aegyptiacus var. felah Santschi

Messor aegyptiacus var. *felah* Santschi, Revue Suisse Zool., 1923, pag. 321.

Questa varietà è distinta dalla forma tipica per il colorito nero uniforme e per la conformazione delle spine epinotali che sono più lunghe, con la base meno larga.

☿ ☿ da Gebel Asfar (Cairo), 12.3.1933; ☿ ☿ Kom Ombo, XI.1930 (leg. Andres).

Hab.: Egitto.

6. Messor aegyptiacus var. foreli Santschi

Varietà citata da Menozzi su esemplari raccolti a Wueste Kaa-Sinai (Ergebnisse der Sinai Expedition, 1927, ecc. — Leipzig, 1929, pag. 125).

Hab.: Algeria, Tunisia, Sinai.

7. Messor arenarius Fabr.

Messor arenarius Emery, Deutsche Ent. Zeit., 1908, pag. 439.
Messor arenarius Emery, Gen. Ins., 1921, pag. 69.
Aphaenogaster arenaria André, Ann. Soc. Ent. France, 1881, pag. 74.

Una serie di ☿ ☿ di Alessandria (Mex), 15.1.1933, alcune delle quali hanno il capo rossiccio (forse var. *thebaica* descritta dal Santschi sopra due ☿ ☿ dell'Egitto, Ann. Soc. Ent. Belg., 1912, pag. 164).

☿ ☿ dal Cairo (Heliopolis), 20.3.1933, da Marsa Matrouh, 18.3.1933 e da Hamman, 15.5.1935.

Hab.: Africa del Nord, Palestina, Siria.

8. Messor barbarus (?) subsp. sahlbergi Forel

Questa razza, descritta sopra ☿ ☿ di Heliopolis (Rev. Suisse Zool., 1913, pag. 428) dovrebbe appartenere al gruppo *aegyptiacus*. I caratteri differenziali citati dall'Autore possono riferirsi infatti ad una delle tante varietà dell'*aegyptiacus*. Non ho veduto i tipi, nè esemplari che possano esser determinati per subsp. *sahlbergi;* certo è però che questa non è una razza del *barbarus* secondo l'ordinamento attuale dei *Messor*.

Hab.: Egitto.

9. Messor minor aralocaspius var. tamerlani Santschi

Messor minor aralocaspius tamerlani var. Santschi, Bol. Real Soc. Esp. Hist. Nat., 1927, pag. 240.

Una serie di ☿☿ da Alessandria (Mex), 13.1.1933 va riferita a questa razza orientale del *M. minor*. Hanno il capo nero, sub-lucido, con alcune strie appena accennate attorno alle fosse antennali; pro- e mesonoto rossi e lucidi, epinoto bruno rosso, striato trasversalmente, visto di profilo arrotondato e senza spine; peduncoli neri, lisci e lucidi; gastro nero, lucido, con peli sparsi anche sulla sua faccia basale. Mandibole rossicce, zampe ed antenne nerastre con le articolazioni rosse.

Hab.: Egitto, Turchestan.

10. Messor rugosus var. crawleyi Santschi

Razza descritta da Santschi (Rev. Zool. Bot. Afr., 1928, pag. 204), citata da Alfieri (Bull. Soc. Roy. Ent. d'Eg., 1931, pag. 46) e conosciuta finora soltanto da varie località dell'Egitto.

11. Messor rufotestaceus Foerster

Messor rufotestaceus Emery, Deutsche Ent. Zeit., 1908, pag. 439.

Un'☿ massima ed alcune piccole di Wadi Isla (Sinai), 28.2.1935, di cui la prima con piccoli denti epinotali.

Hab.: Marocco, Algeria, Sinai, Palestina, Siria.

12. Messor semirufus var. maculifrons Santschi

Messor semirufus var. *maculifrons* Santschi, Bol. Soc. Esp. Hist. Nat., 1927, pag. 228.

Determino per var. *maculifrons* alcune ☿☿ del Cairo (Wadi Hoff, 8.3.1933) anche se la macchia bruna sulla fronte delle stesse è alquando ridotta o addirittura mancante. Ho confrontato gli esemplari raccolti con una serie di ☿☿ del *semirufus* tipico proveniente dal Libano. Le ☿☿ egiziane si distinguono da queste per la mancanza di qualsiasi reticolo microscopico sul gastro, in modo ch'esso risulta liscio e lucidissimo; nelle ☿☿ del Libano il gastro è finissimamente reticolato e perciò meno lucido. Le operaie egiziane sono inoltre più oscure con le zampe nerastre.

Hab.: Egitto, Siria, Caucaso.

13. Messor semirufus var. ebeninus Forel

Messor barbarus semirufus var. *ebeninus* Forel, Ann. Soc. Entom. Belg., 1910, pag. 10.
Messor barbarus semirufus var. *ebeninus* Emery, Gen. Ins., 1921, pag. 72.
Messor semirufus var. *ebeninus* Santschi, Bol. Real. Soc. Esp. Hist. Nat., 1927, pag. 229.

☿☿ di Marsa Matrouh, 17.3.1933 e di Alessandria (Mex), 11.1.1933.

☿ alata. — Tutta nera con le mandibole, funicolo, zampe rossiccie e tarsi giallo rossi. Capo senza le mandibole più largo che lungo, subquadrato, completamente striato in modo molto superficiale, piuttosto lucido, con pochi peli sparsi, più numerosi sulla parte inferiore. Scudo del mesonoto e scutello lisci e lucidissimi; parte superiore dell'epinoto striata trasversalmente, con due sporgenze ottuse. Gastro liscio e molto lucido. Pelosità sul torace e sul gastro scarsa. Ali giallastre con pterostigma piceo.

L. 12 mm.; ala anteriore 13 mm.

Hab.: Egitto, Palestina, Siria.

14. Messor structor Latr.

Specie importata recentemente secondo l'elenco delle formiche egiziane pubblicato dall'Alfieri (Bull. Soc. Roy. Ent. d'Egypte, 1931, pag. 46).

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Secondo Forel (Bull. Soc. vaud. Sc. nat., 1908, pag. 14) e Karawaiew (Revue Russe d'Ent., 1911, pag. 4) proviene dall'Egitto anche il *Messor* (*barbarus*) *striaticeps* André. Nella Revue suisse Zool., 1923, pag. 317 e segg. Santschi esamina i tipi di questa specie conservati nel Museo di Parigi, provenienti dal Caucaso e dal Marocco e conclude che:

1) devono esser ascritti tutti alla superspecie *structor;*

2) l' ☿ del Caucaso deve esser considerata quale subspecie *striaticeps* (=*Aphaenogaster barbara* var. *striaticeps* André) e che

3) le ☿☿ del Marocco vanno riferite alla subsp. *abdelazizi* Santschi.

Dato l'ordinamento proposto da Santschi a quale razza appartiene il *Messor barbarus striaticeps* determinato da Forel e Karawaiew ? Non posso dir nulla in proposito non avendo avuto in esame esemplari egiziani.

Tabella delle ☿☿ dei *Messor* egiziani:

1. I quattro ultimi articoli del funicolo molto allungati; esemplari di color giallo ..... *rufotestaceus*

— I quattro ultimi articoli del funicolo non allungati; esemplari di altra colorazione 2

2. Primo articolo del funicolo meno lungo del secondo ..... *arenarius*

— Primo articolo del funicolo lungo tanto quanto il secondo 3

3. Occipite con striatura trasversale più o meno distinta .. *rugosus crawleyi*

— Occipite striato longitudinalmente o liscio 4

4. Epinoto munito di denti o spine 5

— Epinoto inerme 7

5. Almeno il torace rosso ..... *aegyptiacus*

— Tutta nera 6

6. Faccia occipitale lucida, sparsa di piccole fossette arrotondate .....
..... *aegyptiacus foreli*

— Le strie del capo raggiungono l'occipite ..... *aegyptiacus felah*

7. Capo di color rosso ..... *semirufus maculifrons*

— Capo nero 8

8. Torace di solito rosso con rugosità assai superficiale, talvolta leggermente lucido ..... *minor aralocaspius tamerlani*

— Torace di solito nero o appena un po' rossastro; rugosità del torace più profonda; opaco ..... *semirufus ebeninus*

15. Pheidole jordanica Saulcy

Pheidole sinaitica subsp. *laticeps* Mayr, Res. Swed. Zool. Exped., 1903, pagg. 6-7.
Pheidole jordanica Alfieri, Bull. Soc. Roy. Entom. d'Egypte, 1931, pag. 45.
Pheidole megacephala subsp. *obtusa* Stitz, Mitth. Zool. Mus. Berlin, 1916, pag. 340, fig. 8.
Pheidole jordanica Emery, Gen. Ins., 1921, pag. 84.

Specie conosciuta dall'Egitto secondo Mayr (1903, l.c.) e Alfieri (1931). Grazie alla gentilezza del mio amico Menozzi ho potuto esaminare un ♂ di Port Sudan ed alcune ☿☿ e ♀♀ di Ezbet el Nakhl (Egitto), esemplari conservati nella sua collezione.

La ♀ ha il capo, senza le mandibole, alquanto più largo che lungo, di forma trapeziale, con gli angoli occipitali arrotondati e l'occipite leggermente incavato. Clipeo con carena mediana distinta, piuttosto lucido e con striatura ridottissima. Il triangolo frontale è liscio e lucido. Tutto il capo è profondamente striato in senso longitudinale; la striatura è ridotta dietro gli occhi. Scudo del mesonoto con striatura fine, con le parti mediane e laterali liscie e lucide; scutello liscio e lucido; epinoto striato ed opaco; spine epinotali ben sviluppate con base larga, lunghe un po' meno della loro distanza basale.

Postpeziolo largo meno del doppio del peziolo, non dilatato nè dentato.

Gastro liscio e lucido, con peluria lunga e gialla.

Ali giallastre. Tutto il corpo è giallo-rossiccio, col torace giallo-bruno e gli arti di un giallo carico.

L. 6 mm.

La *Ph. megacephala* subsp. *obtusa* descritta dal collega Stitz sopra tre 4 4 dell'Egitto è da ascriversi alla *Ph. jordanica*. Grazie alla gentilezza dell'autore ho potuto esaminare il tipo e stabilire la sinonimia. È caratteristica nella *Ph. jordanica* (4) la conformazione del postpeziolo che, visto di sopra, è globoso, sempre poco più largo del peziolo e va percio' unita al gruppo *sinaitica*. Nella *Ph. megacephala* e *pallidula* (4) il postpeziolo è sempre molto più largo del peziolo.

Diffusa nella Cirenaica, Egitto, Sudan, Palestina.

16. Pheidole pallidula arenarum var. recticeps Forel

Pheidole pallidula tristis var. *recticeps* Forel, Bull. Soc. vaud. Sc. Nat., 1909, pag. 391.
Pheidole pallidula arenarum var. *recticeps* Emery, Rev. Zool. Afr., 1915, pag. 226.
Pheidole pallidula arenarum var. *recticeps* Emery, Gen. Ins., 1921, pag. 87.

Molte ☿☿ e 4 4 provenienti da : Alessandria (Abukir), 14.1.1933; Alessandria (Mex), 3.4.1933; Meadi (Cairo), 2.8.1933; Cairo (Piramidi), 2.8.1933; Marsa Matrouh, 17.3.1933; Soloum, 23.3.1933; Helouan, 25.2.1933; Ismaila, 16.4.1933; Dekeihla, 5.9.1933; Atar El Nabi, 28.7.1933; oasi di Siwah, 26.3.1933; Wadi Digla, 5.9.1933; Wadi Feran (Sinai), 4.3.1935.

I 4 4 provenienti da quest'ultima località sono di color giallo carico, mentre gli altri sono piuttosto bruni. Osservo in genere che le variazioni nella forma della testa dei 4 4 sono notevoli, avendo talvolta i lati quasi paralleli e talvolta piuttosto arcuati. È caratteristica comunque la conformazione del postpeziolo, che, visto dall'alto, ha i margini dilatati e più o meno angolosi o addiritura dentati. Il solco epinotale è stretto e i denti dell'epinoto sono esili e rivolti all'insù. Tali caratteri si riscontrano pure nella var. *orientalis* Emery (1) ; ma la var. *recticeps* ha il capo decisamente più allungato con i lati più rettilinei, sopratutto nella parte anteriore e la statura è maggiore. Tali differenze sono senz'altro difficilmente apprezzabili senza materiale di confronto e la difficoltà di determinare le due varietà cresce esaminando le rispettive femmine.

Diffusa nella Tunisia, Algeria, Cirenaica, Egitto, Sinai.

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(1) Vedi a questo proposito : Müller, Boll. Soc. Adr. Sc. nat. Trieste, 1923, pagg. 67-70, che scoprì e mise in evidenza la forma dell'epinoto e del postpeziolo della *Ph. pallidula* e della var. *orientalis*.

17. Pheidole sinaitica Mayr

Pheidole sinaitica Mayr, Verh. Zool. Bot. Gesell. Wien, 1862, pag. 745.
Pheidole sinaitica Er. André, Species Hym. Europe, 1881, pag. 76.
Pheidole sinaitica Emery, Rev. Zool. Afr., 1915, pag. 234.
Pheidole sinaitica Emery, Genera Insect., 1921, pag. 87.

Poche ☿☿ di Asyut, 3.2.1933, e di Ikingi Mariout, 16.3.1935. Ho esaminato una serie di ♂♂, ☿☿ e ♀♀ provenienti da Jericho (Palestina, 27.4.1933) e da Haifa (2.5.1933).

Questa specie, caratteristica per avere gli articoli del funicolo più lunghi che larghi ad eccezione del secondo, è distinta dalla *pallidula* e sue varietà per avere il postpeziolo « kugelig, seitlich nicht erweitert » come dice giustamente il Mayr (l.c.) nella sua ottima e minuziosa descrizione del ♂. Per

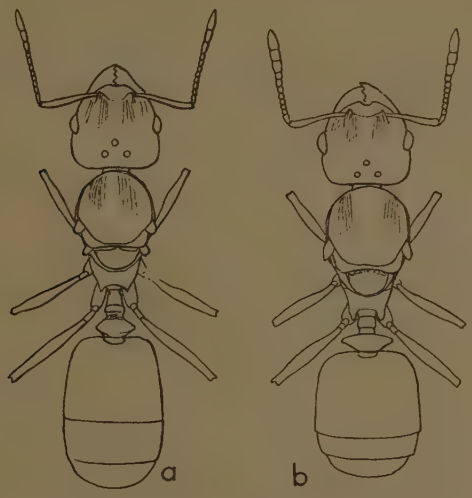

Fig. 1 — (a) *Pheidole sinaitica* Mayr, ♀ di sopra; (b) *Pheidole teneriffana* Forel, ♀ di sopra.

questo carattere va unita alla *Ph. jordanica* che ha però gli articoli del funicolo conformati altrimenti. Da Jericho provengono pure 2 ♀♀ dealate di cui do la descrizione:

♀ dealata. — Capo trapezoidale, occipite diritto senza incavature con i lati leggermente arrotondati; clipeo inciso nel mezzo con solco mediano distinto che raggiunge il triangolo frontale; lamine frontali leggermente divergenti all'indietro; occhi situati piuttosto verso le mandibole; il loro diametro minore è circa di un quinto della lunghezza laterale del capo senza mandibole; lo scapo raggiunge gli ocelli; gli articoli del funicolo, ad eccezione del secondo, più lunghi che larghi; capo tutto striato longitudinalmente, ma le

strie sono superficiali sull'area frontale, profonde e più larghe ai lati soprattutto sulle guancie e sopra gli occhi; mandibole sublucide, cosparse di punti allungati.

Scudo del mesonoto con strie superficiali ed un accenno di carena lucida nella sua parte mediano-anteriore; scutello liscio e lucido; epinoto striato trasversalmente con spine corte ed acute, ma di base larga; solco epinotale largo e poco profondo; lati del torace rugosi o striati ed opachi.

Peziolo rugoso; postpeziolo, visto di sopra, di larghezza doppia del peziolo con i lati dilatati; il postpeziolo ha la forma di un trapezio molto schiacciato ed è opaco e striato.

Base del gastro punteggiata ed opaca; ma la punteggiatura va degradando verso il margine opposto del primo tergite, in modo che il tegumento di questo diviene man mano più lucido; gli altri segmenti del gastro lisci e lucidi.

Corpo coperto da fitta pubescenza giallastra, più rada sulla testa.

Color bruno-rossiccio, col capo più chiaro; antenne e zampe giallo-rossicie.

L. 7 mm.

Nota dalla Tunisia, Egitto, Sinai, sponde del Mar Rosso.

18. Pheidole teneriffana Forel

Pheidole teneriffana Forel, Ann. Soc. Ent. Belg., 1893, pag. 465.
Pheidole teneriffana Forel, Rev. Suisse Zool., 1913, pag. 430.
Pheidole teneriffana Emery, Rev. Zool. Afr., 1915, pag. 235.
Pheidole teneriffana Emery, Gen. Ins., 1921, pag. 89.
Pheidole teneriffana Alfieri, Bull. Soc. Roy. Entom. d'Egypte, 1931, pag. 45.

Molti ♂♂ e ☿☿ dal Cairo (Gebel Asfar), 12.3.1933; Heliopolis, 10.1930 (leg. Andres); Barrage, 31.8.1933; Meadi (Cairo), 4.7.1933.

Da Barrage proviene un'unica ☿.

☿ dealata. — Capo di forma trapeziale, con i lati arrotondati; occipite non incavato; lamine frontali fortemente divergenti all'indietro, prolungate fino all'altezza degli occhi; strie del capo profonde, longitudinali; esse raggiungono l'occipite e sono egualmente spaziate; articoli II-V del funicolo tanto larghi quanto lunghi.

Torace conformato come la ☿ della *Ph. sinaitica*; le spine epinotali con la base più larga, tozze, più robuste e meno appuntite.

Di profilo il peziolo con stelo più lungo, con nodo distinto per quanto ridotto; pospeziolo, visto di sopra, largo più del doppio del peziolo, con la parte anteriore quasi diritta in modo da farlo apparire quale un trapezio molto schiacciato e con i lati obliqui molto convergenti verso il gastro. In altre parole la dilatazione laterale del postpeziolo è assai pronunciata, in modo da occupare tutti i lati e finire in punta. Mentre il peziolo è rugoso, il postpeziolo è striato trasversalmente.

Parte basale del gastro coperto da una punteggiatura fitta ma assai superficiale. Tegumento del gastro lucido.

Pelosità gialla e piuttosto lunga; ridotta sulla testa.

Colore bruno-rossiccio; gastro, parte anteriore del mesonoto, occipite bruno-picco, zampe e antenne giallo-rossicce.

L. 6,5 mm.

Hab.: Teneriffa, Tunisia, Egitto, Siria, Eritrea; scoperta recentemente sull'Isola di Milos (Egeo — vedi Zimmermann, Sitz. Ber. Ak. Wiss. Wien, 1934, pag. 68), Asia minore. Probabilmente cosmopolita o sulle via di diventarlo.

Per distinguere i ♁ ♁ delle *Pheidole* egiziane varrà la seguente tabella:

♁ ♁

1. Visto di sopra il postpeziolo è più o meno globoso; sempre poco più largo del peziolo 2

— Visto di sopra il postpeziolo è più o meno dilatato ai lati, angoloso o dentato; sempre molto più largo del peziolo 3

2. II-V articolo del funicolo più lunghi che larghi ..... *sinaitica*

— II-V articolo del funicolo lunghi quanto larghi ..... *jordanica*

3. Le strie del capo raggiungono l'occipite e sono profondamente impresse; solco epinotale largo; spine epinotali robuste, con la base larga, lunghe circa quanto la loro distanza basale ..... *teneriffana*

— Le strie del capo sono superficiali e non raggiungono nemmeno la parte mediana della testa che ha l'occipite liscio e molto lucido; solco epinotale stretto; spine epinotali piccolissime, talvolta appena accennate .... *pallidula arenarum* var. *recticeps*

♀ ♀ [2]

1. Visto di sopra postpeziolo largo il doppio del peziolo, o poco meno, poco o non dilatato ai lati 2

— Visto di sopra postpeziolo largo più del doppio del peziolo o poco più, dilatato ai lati, angoloso o addirittura dentato 3

---

[2] Oltre ai caratteri citati che distinguono la *Ph. teneriffana* dalla *Ph. pallidula arenarum recticeps* osservo ancora che la pelosità è del tutto differente essendo molto più abbondante e fitta nella prima che nella seconda. In questa ultima mi pare che i peli sieno anche più sottili. Esistono ♀ ♀ di *Ph. pallidula arenarum recticeps* che per la punteggiatura della base del gastro e per lo sviluppo delle spine si avvicinano alla *Ph. teneriffana*; ma in esse è caratteristica la conformazione del postpeziolo.

2. Spine epinotali brevissime, triangolari, acute, piuttosto orizzontali; capo largo quanto il torace e più allungato ..... *sinaitica*

— Spine epinotali molto più lunghe, rivolte all'infuori; capo largo un po' più del torace e meno allungato ..... *jordanica*

3. Base del gastro con punteggiatura finissima in modo da farla risultare opaca o quasi; postpeziolo più schiacciato, meno lungo, vistosamente dentato, con rugosità trasversale profonda; spine epinotali molto sviluppate, triangolari; capo dietro gli occhi con rughe profonde spaziate. scudo del mesonoto tutto striato ad eccezione di una piccolissima por zione antero-mediana ..... *teneriffana*

— Base del gastro liscia e lucida; postpeziolo più corto, leggermente dentato, con rugosità trasversale superficialissima; spine epinotali ridotte a due rilievi ottusi; le rughe dietro gli occhi sono molto ridotte ed appena accennate; scudo del mesonoto liscio e lucido ad eccezione della parte posteriore verso lo scutello assai leggermente striata .... *pallidula arenarum recticeps*

19. Cardiocondyla elegans var. sahlbergi Forel

Cardiocondyla elegans var. *sahlbergi* Forel, Rev. Suisse Zool., 1913, pag. 429.
Cardiocondyla elegans var. *sahlbergi* Emery, Gen. Ins., 1921, pag. 125.

La varietà venne descritta da Forel sopra alcune ♀♀ della Palestina e del Caucaso. Io credo che l'autore abbia avuto in esame ☿☿, data la lunghezza degli esemplari (mm 2 — vedi a proposito Emery — l.c. pag. 125). Il collega Koch raccolse a Heluan, 23.2.1933 una serie di ☿☿ e ♀♀ che non esito a riferire alla var. *sahlbergi*.

L'☿ ha il capo opaco o subopaco, essendo la punteggiatura più marcata che nella forma tipica proveniente dall'Italia; altrettanto si puo' dire del torace; le spine epinotali sono più sviluppate, con la base più larga; peziolo e postpeziolo egualmente sviluppati, ma molto meno lucidi; anzi il peziolo è opaco e il postpeziolo è leggermente rugoso-striato. Il gastro è lucido; ma la pubescenza è più marcata.

Clava, capo, parte mediana delle tibie, femori e gastro bruni; il resto del corpo giallo-rossiccio.

L. 1,8 mm.

Nella ♀ si riscontrano le stesse differenze nella punteggiatura, nell'opacità e nel colorito; ma il capo presenta una notevole differenza, essendo quasi ovale nella forma tipica e cioè con i lati molto arcuati; mentre la varietà ha lati del capo più diritti, in modo ch'esso è meno largo.

L. 2,5 mm.

Hab.: Egitto, Palestina, Caucaso.

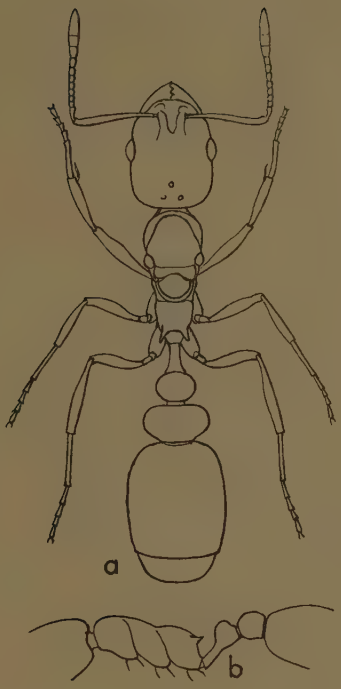

Fig. 2.

Cardiocondyla elegans

var. *sahlbergi* Forel :

(a) ♀ di sopra,

(b) ☿ di profilo.

20. Cardiocondyla elegans var. torre-tassoi nov.

? *Cardiocondyla elegans* var. *santschii* Forel, Rev. Suisse Zool., 1911, pag. 457.

☿. — Tutta nera ; soltanto le mandibole, scapo, primi articoli del funicolo e tarsi bruno-rossicci molto scuri.

Capo sub-opaco fittamente punteggiato, con i lati leggermente arcuati, più lungo che largo.

Torace leggermente striato sui lati ; sopra punteggiato ed opaco ; solco meso-epinotale impresso ; spine epinotali piccole, triangolari.

Peziolo con nodo arrotondato nella parte superiore con stelo esile ; il nodo è di lunghezza uguale allo stelo. Postpeziolo largo il doppio del peziolo, con la parte anteriore non o appena incavata.

Gastro liscio, lucido, con pubescenza brevissima, per quanto abbondante.

L. 2 mm.

Una serie di ☿☿ raccolte a Wadi Hoff l'8.3.1933, a Tor (Sinai), 25.2.1935, e Wadi Garrawi, 24.3.1935.

Credo che gli esemplari provenienti dal Cairo e determinati da Forel (l.c. pag. 457) per var. *santschii* vanno riferiti alla *torre-tassoi* mihi.

La var. *santschii* proviene dalla Francia meridionale (vedi a proposito Santschi, Bull. Mus. Nat. Hist. Nat. Paris, 1926, pag. 293) e probabilmente dalla Spagna (Emery, Deutsche Ent. Zeit., 1909, pag. 22); si distingue

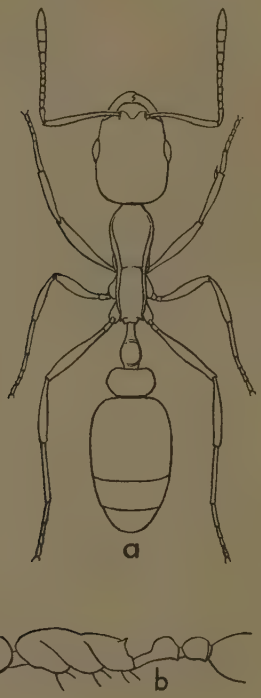

Fig. 3.

Cardiocondyla elegans var. *torre-tassoi* nov.:

(a) ☿ di sopra,

(b) ☿ di profilo.

dalla forma tipica per il colorito più scuro. Anche non avendo veduti esemplari ritengo che quelli dell'Egitto appartengono al gruppo orientale distinto dalla forma italiana per i caratteri di scultura e per la forma del capo.

21. Cardiocondyla emeryi subsp. mahdii Karawaiew

Cardiocondyla emeryi subsp. *mahdii* Karawaiew, Revue russe d'Ent., 1911, pag. 8.

Alcune ☿ ☿ dall'Oasi di Siwah, 23.3.1933 e da Meadi (Cairo), 19.7.1933.

Alla buona descrizione dell'Autore aggiungo ancora che l'epinoto nella ☿ è fornito di spine triangolari ben sviluppate.

Da Meadi proviene una serie di ♀ ♀ dealate:

♀. — Capo più lungo che largo, con i latì un po' arrotondati, leggermente più ristretto davanti, con l'occipite diritto; occhi ovali, situati in avanti verso le mandibole; lo scapo, ripiegato all'indietro non raggiunge l'occipite. Tutto il capo è ricoperto da una serie regolare di fossette che, ad un debole ingrandimento, lo fanno apparire rugoso ed opaco. Tale rugosità occupa pure il torace e più finemente i peduncoli. L'epinoto porta due spine robuste, triangolari, rivolte orizzontalmente all'indietro. Il peziolo, visto di fronte,

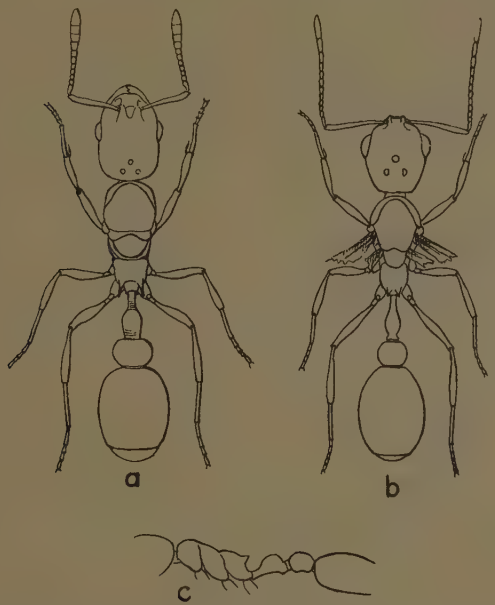

Fig. 4. — *Cardiocondyla emeryi* subsp. *mahdii* Karawaiew: (a) ♀ di sopra, (b) ♂ di sopra, (c) ☿ di profilo.

è peduncolato; il suo nodo è arrotondato. Il postpeziolo, visto di sopra, è ovale, poco più largo che lungo e troncato davanti. Il gastro è lucido; coperto poi di fitta pubescenza biancastra aderente. Corpo giallo-bruno o bruno-piceo; gastro piceo; mandibole, antenne, esclusa la clava, zampe gialle.

L. 2 mm.

A Meadi, 9.8.1933 e ad Atar El Nabi, 28.3.1933 vennero raccolti anche alcuni ♂♂ che riferisco alla subsp. *mahdii*.

♂. — Capo ovale, senza gli occhi, non più largo del torace, ristretto in avanti; occipite fortemente arrotondato. Occhi assai leggermente ovali. Lo scapo, ripiegato all'indietro, arriva sino ai due ocelli appaiati; la clava è indistinta o quasi; soltanto gli ultimi tre o quattro articoli del funicolo sono

un po' più lunghi degli altri. Capo rugoso, con area frontale liscia e lucida. Torace rugoso ed opaco; spine epinotali triangolari, ben sviluppate. Peziolo, di profilo, con peduncolo lungo e con nodo assai poco arrotondato. Postpeziolo ovale o quasi, largo circa il doppio del peziolo. Peziolo opaco; postpeziolo e gastro lisci e lucidi.

Capo bruno, gastro piceo, mandibole, antenne, torace, zampe, peduncoli gialli.

L. 1,8 mm.

Hab.: Egitto, Sudan.

22. Cardiocondyla emeryi subsp. schatzmayri nov.

☿. — Capo più lungo che largo, con i lati arrotondati e l'occipite piuttosto diritto, coperto di fossette superficiali che gli conferiscono un aspetto rugoso ed opaco. Torace e peduncoli con striatura superficialissima e lucidi.

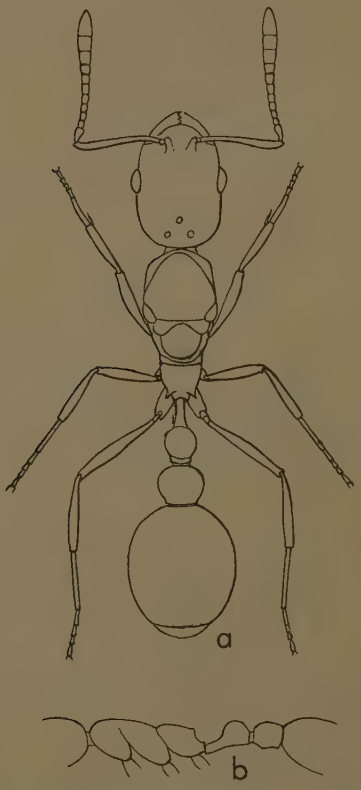

Fig. 5.

Cardiocondyla emeryi subsp. *schatzmayri* nov.:

(a) ☿ di sopra,

(b) ☿ di profilo

L'epinoto è meno lucido e privo di spine; al loro posto ha due rilievi triangolari appena accennati. L'assoluta mancanza di spine o denti distingue nettamente la nuova razza dalla specie tipica e dalle sue varietà. Gastro lucido e liscio. Tutto il corpo giallo-bruno, ad eccezione del gastro che è piceo e del capo che è bruno-piceo come la clava.

L. 2,2 mm.

La ♀ (dealata) è giallo-rossiccia con la clava, parte superiore della testa dal triangolo frontale all'occipite, regione dell'inserzione delle ali, metanoto, femori bruno scuri e il gastro bruno-piceo. Capo, torace e peduncoli rugoso-punteggiati opachi; un accenno di lucidità sullo scutello; gastro lucido con pelosità fitta ma brevissima. Il resto del corpo è glabro. L'epinoto porta due rilievi triangolari; il peziolo ha il nodo globoso ed uno stelo esile; il postpeziolo sub-ovale tanto largo quanto lungo è, visto di sopra, largo un terzo più del peziolo.

L. 2,8 mm.

La descrizione dell' ☿ è fatta sopra esemplari raccolti a Helouan, 2.3.1933; quella delle ♀♀ su esemplari di: Alessandria (Mex), 13.1.1933, Barrage, 3.9.1933, Kirdassah, 7.9.1933, Atar El Nabi, 6.8.1933, e Wadi Halfa (Sudan), 12.2.1933.

Hab.: Egitto, Sudan.

23. Cardiocondyla nuda var. fayumensis Forel

Secondo Forel (Revue suisse Zool., 1913, pag. 429) la var. *fayumensis*, descritta sopra una serie di ♀♀, dovrebbe distinguersi dalla var. *mauritanica* Forel per le antenne un po' più corte e sopratutto per la colorazione decisamente più chiara (rouge jaunâtre) del torace, peduncoli ed antenne.

Loc. class.: Fayum.

24. Cardiocondyla nuda var. mauritanica Forel

Cardiocondyla nuda var. *mauritanica* Forel, Annales Soc. Entom. Belg., 1890, pag. LXXV.
Cardiocondyla nuda var. *mauritanica* Emery, Deutsche Ent. Zeit., 1909, pag. 25.
Cardiocondyla nuda var. *mauritanica* Karawaiew, Revue russe Ent., 1911, pag. 8.
Cardiocondyla nuda var. *mauritanica* Forel, Rev. Suisse Zool., 1911, pag. 457.
Cardiocondyla nuda var. *mauritanica* Emery, Gen. Ins., 1921, pag. 126.

Nota da Assuan, Cairo, Khartum. Ho visto una serie di ☿☿ e ♀♀ alate raccolte a Wadi Isla (Sinai), 28.2.1933.

Hab.: Algeria meridionale, Tunisia, Cirenaica, Egitto, Sinai, Palestina, Cipro.

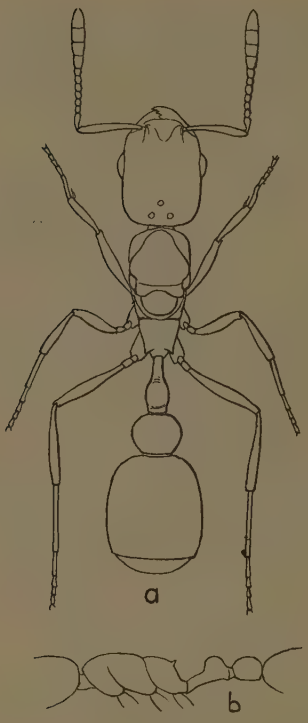

Fig. 6.

Cardiocondyla

nuda mauritanica Forel:

(a) ♀ di sopra,

(b) ☿ di profilo.

***

Tabella delle ☿ ☿ delle *Cardiocondyla* egiziane:

1. Visto di sopra postpeziolo ovale, poco più largo che lungo 2

— Visto di sopra postpeziolo molto più largo che lungo, di solito più o meno distintamente a forma di cuore 4

2. Solco meso-epinotale poco distinto; epinoto munito di due piccole spine triangolari, brevi, con base larga; rugosità del torace più distinta in modo ch'esso risulta opaco ..... *nuda mauritanica*

— Solco meso-epinotale ben distinto; epinoto angoloso senza spine o munito di spine acute, con base stretta, lunghe come la loro distanza basale; rugosità del torace assai superficiale, in modo ch'esso è piuttosto lucido 3

3. Epinoto semplicemente angoloso ..... *emeryi schatzmayri*

— Epinoto munito di spine acute ..... *emeryi mahdii*

4. Tutta picea ..... *elegans torre-tassoi*

— Scapo, articoli che precedono la clava, torace, peduncoli, articolazioni delle zampe, tarsi giallo-rossicci ..... *elegans sahlbergi*

25. Crematogaster jehovae Forel

Crematogaster auberti subsp. *jehovae* Emery, Deutsche Ent. Zeit., 1912, pag. 662.
Crematogaster auberti subsp. *jehovae* Emery, Gen. Ins., 1921, pag. 142.
Crematogaster jehovae jehovae Emery, Boll. Soc. Ent. Ital., 1926, pag. 3.
Crematogaster jehovae Menozzi, Erg. der Sinai Exp., 1929, Leipzig, pag. 125.

Una serie di ☿☿ ed una ♀ di Tor (Sinai), 24.4.1933.

♀ dealata. — Capo senza le mandibole più largo che lungo; occipite quasi diritto, lati leggermente arcuati; occhi situati circa nel mezzo dei lati del capo; linee frontali quasi diritte, brevi; esse arrivano sino a metà del diametro degli occhi; le strie del capo partono dal margine anteriore e girano attorno gli occhi in modo che l'occipite risulta striato trasversalmente; area frontale sub-lucida; mandibole striate.

Scudo del mesonoto liscio e lucido, visto di profilo spiovente verso il pronoto, molto più alto del capo; scutello lucido; epinoto senza spine o rilievi ottusi, striato trasversalmente nella parte superiore; quasi liscio e lucido e convesso nella faccia discendente.

Peziolo romboidale e striato; postpeziolo schiacciato, liscio e lucido; gastro liscio e lucido, con punti piligeri evidenti.

Bruno-picea con le mandibole, antenne, margini anteriori del capo e zampe rossiccie.

L. 9,5 mm.

Hab.: Sinai, Palestina e Siria.

26. Crematogaster inermis Mayr

Crematogaster inermis Emery, Deutsche Ent. Zeit., 1912, pag. 663.
Crematogaster inermis Emery, Gen. Ins., 1921, pag. 143.
Crematogaster inermis Emery, Boll. Soc. Ent. It., 1926, pag. 2.
Crematogaster inermis Alfieri, Bull. Soc. Roy. Entom. d'Egypte, 1931, pag. 44.
Crematogaster inermis Menozzi, Erg. der Sinai Exp., 1929, Leipzig, pag. 125.

Nel determinare i *Crematogaster* egiziani ho seguito lo schema proposto dall'Emery nel 1926 il quale divide tutte le forme *inermis*, *auberti* e *laestrygon* in due gruppi: *laestrygon* ed *inermis*, a seconda della grandezza degli occhi, della loro posizione e della grossezza delle antenne. I *Crematogaster* egiziani appartengono senz'altro al gruppo *inermis* per aver le antenne sottili, gli occhi più piccoli e più discosti dall'occipite.

Gli esemplari esaminati provengono da: ♀♀ Alessandria (Mex), 3.4.1933; ☿☿ Abou Rouache, 9.3.1933; ☿☿ Meadi (Cairo), 11.7.1933.

Hab.: Egitto, Palestina, Siria.

27. Crematogaster inermis antaris var. nigripes Emery

Crematogaster auberti antaris var. *nigripes* Emery, Boll. Soc. Ent. Ital., 1924, pag. 9.

Credo di riconoscere questa varietà in una serie di ☿☿ raccolte al Cairo (Wadi Hoff), 22.1.1933 ed altre provenienti da Heliopolis, X.1930 (leg. Andres).

2 ♀♀ dealate di Gebel Asfar (Cairo), 12.3.1933 e di Wadi Digla, 24.2.1933 dovrebbero esser riferite alla var. *nigripes*.

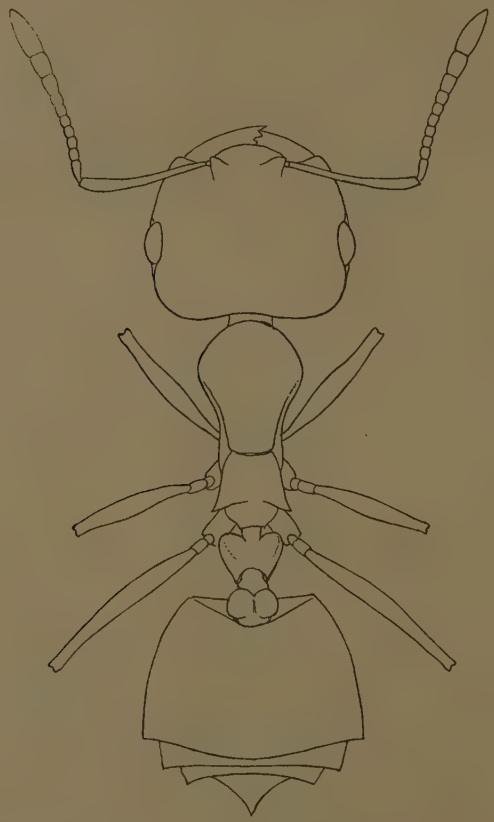

Fig. 7. — *Crematogaster inermis antaris* var. *nigripes* Em.: ☿ di sopra.

Le ☿☿ sono uniformemente bruno-picee col capo lucido, senza le mandibole, un po' più largo che lungo, con l'occipite poco incavato ed i lati arcuati. Pro- e mesonoto assai leggermente rugosi, epinoto piuttosto lucido; spine epinotali triangolari, molto brevi, un po' rivolte all'infuori. Scapo, ar-

ticoli del funicolo senza la clava, mandibole, postpeziolo, articolazioni delle zampe rossiccie.

Alcune ☿ ☿ ed una ♀ dealata raccolte a Tor (Sinai), 26.2.1935, sono leggermente distinte dalle altre per avere le spine epinotali un po' più lunghe. La ♀ di questa varietà ha il capo largo 2 mm. e, con le mandibole, lungo altrettanto (1.5 mm. senza le stesse) ; occipite diritto, lati quasi diritti, angoli occipitali marcati. Parte mediana del clipeo liscia e lucida ; porzione anteriore del capo punteggiato-striata ; occipite soltanto punteggiato e lucido. Torace, postpeziolo e gastro lisci e lucidi ; postpeziolo striato, ma lucido. Epinoto con due rilievi spinosi.

Tutta nera, con le antenne, mandibole, zampe rossastre.

L. 9,5 mm.

Il *Cr. inermis* e la var. *nigripes* sono le forme più diffuse nell'Egitto. Il *Cr. auberti laevithorax* For. citato da Emery (Deutsche Ent. Zeit., 1912, pag. 662) e proveniente dal Cairo deve probabilmente riferirsi alla var *nigripes*. L'Autore scrive infatti che per la scultura l'esemplare (☿) del Cairo va unito al *laevithorax*, ma « die Dornen sind viel kürzer ; ich betrachte sie als einen übergang zu *inermis* ».

La varietà è conosciuta finora dalla Cirenaica e dall'Egitto.

Tabella delle ☿ ☿ dei *Crematogaster* egiziani:

1. Epinoto senza spine ..... *inermis*

— Epinoto spinoso 2

2. Capo, torace e peduncoli rossicci o bruno rossicci ; lati del pronoto rugoso-striati ; lati del capo più arcuati in modo che l'occipite è un po' più largo del torace ; spine brevi, ma più sottili ..... *jehovae*

— Capo, torace e peduncoli bruno-picei ; lati del pronoto quasi lisci e lucidi ; lati del capo meno arcuati in modo che l'occipite è largo quasi il doppio del torace ; spine brevissime, triangolari .... *inermis antaris* var. *nigripes*

28. Monomorium pharaonis L.

Secondo Alfieri (l.c. pag. 44) la specie venne raccolta a El Santa.

Hab. : Cosmopolita.

29. Monomorium venustum subsp. nilotica Emery

Monomorium niloticum Emery, Deutsche Ent. Zeit., 1908, pag. 678.

☿ Wadi Hoff, 8.3.1933 ; ☿ Cairo (Massara), 25.1.1933 ; ☿ Helouan (Wadi Garrawi), 8.9.1933 ; ☿ Tor (Sinai), 26.2.1935 ; ☿ Wadi Isla (Sinai), 27.2.1935.

Gli esemplari misurano sino a 3,7 mm.

Hab.: Egitto, Sinai.

30. Monomorium salomonis L.

Mayr (l.c. 1905, pag. 4), Karawaiew (l.c. 1911, pag. 4), Forel (l.c. 1910, pag. 251) indicano questa specie come proveniente dall'Egitto. I numerosissimi esemplari studiati da me appartengono tutti alle varietà riportate più innanzi.

Hab.: Egitto (?), Sinai (?), Palestina, Caucaso, Asia centrale.

31. Monomorium salomonis var. sommieri Emery

Monomorium salomonis var. *sommieri* Emery, Deut. Ent. Zeit., 1908, pag. 676.

Riferisco a questa varietà alcune ☿☿ raccolte a Heliopolis, X.1930, ed inviatemi a suo tempo da Andres.

Hab.: Lampedusa, Algeria, Tunisia, Cirenaica, Egitto, Sinai.

32. Monomorium salomonis var. obscurata Stitz

Monomorium salomonis var. *obscurata* Stiz, Mitth. Zool. Mus. Berlin, 1916, pag. 346.

Forma di colorazione assai variabile; testa bruna o bruno-picea come il gastro, torace da rosso testaceo (passaggi alla var. *zanoni* Emery della Cirenaica) a bruno o bruno-piceo. Alle volte il torace è parzialmente rossiccio. Testa sub-lucida; così pure il torace.

☿♀ Ikingi Mariout, 16.3.1935; ☿ Soloum, 24.3.1933; ☿♀ Oasi di Siwah, 27.3.1933; ☿♀♂ Ismaila, 16.4.1933; ☿♀ Marsa Matrouh, 17.3.1933; ☿ Meadi, 4.2.1935; ☿ El Rus, 23.1.1933; ☿ Gebel Asfar, 11.4.1933; ☿ Cairo (Sakkarah), 19.2.1933; ☿ Helouan, 2.3.1933; ☿ Alessandria (Mex), 15.1.1933; ☿ Atar El Nabi, 28.7.1933; ☿ Tor (Sinai), 25.2.1935.

♂. — Capo più largo che lungo, leggermente ristretto davanti, con l'occipite diritto e più largo del torace; fittamente rugoso ed opaco; occhi grandi; il loro diametro è lungo più della metà dei lati del capo.

Scudo del mesonoto opaco di sopra con striatura superficialissima, piuttosto lucido sui lati; scutello lucido e liscio; epinoto striato come il mesonoto e a curva continua.

Peduncoli opachi con densa e fine microscultura. Gastro sub-lucido. Color bruno uniforme con le antenne, mandibole, inserzione dei peduncoli, tibie e tarsi gialli.

Ali ialine.

L. 4,5 mm; ala anteriore 4 mm.

Hab.: Algeria, Tunisia, Cirenaica, Sinai, Egitto.

33. Monomorium salomonis var. didonis Santschi

Monomorium salomonis var. *didonis* Santschi, Bol. Real Soc. Esp. Hist. Nat., 1921, pag. 425.

Alcune ☿☿ di Marsa Matrouh — 31.3.1933.

Hab.: Algeria, Tunisia, Cirenaica, Egitto.

34. Monomorium subopacum F. Sm.

Alfieri nel suo elenco (l.c. pag. 44) riporta questa specie dal Cairo. I suoi esemplari vanno riesaminati sulla base del lavoro di Santschi (Boll. et Ann. Soc. Ent. Belg., 1927, pag. 240 e segg.) che considera il *subopacum*, non razza del *salomonis*, ma specie a sè. Nel vasto materiale studiato non ho veduto un solo esemplare da poter ascrivere alla specie tipica.

Hab.: Madera, Canarie, Spagna, Africa minore, Egitto (?).

35. Monomorium subopacum var. phoenicia Emery

Monomorium salomonis subopacum var. *phoenicia* Emery, Deutsche Ent. Zeit., 1908, pag. 677.
Monomorium subopacum var. *phoenicum* Santschi, Ann. et Bull. Soc. Ent. Belg., 1927, pag. 242.
Monomorium subopacum var. *phoenicium* Menozzi, Mem. Soc. Ent. Ital., 1933, pag. 62.

Alcune ☿☿ ed una ♀ dealata di Dekeihla, 5.4.1933.

La ♀, lunga 5 mm., è totalmente opaca: visto di profilo l'occipite è troncato. Tale carattere valutato insieme alla forma dell'epinoto (faccia basale e dorsale staccate) e a quello del peziolo (di profilo più grosso e col nodo più alto) distingue la ♀ della varietà *phoenicia* dalle ♀♀ delle razze del *M. salomonis*.

Il capo, senza le mandibole, è sub-quadrato, con i lati assai leggermente arcuati. Tutto il corpo è rugoso-striato; l'epinoto è coperto di striatura trasversale più larga e profonda. Il gastro è pure opaco e coperto di fitta e corta peluria aderente, giallastra che gli conferisce un aspetto sericeo. I margini inferiori dei segmenti del gastro portano una serie di peli eretti e lunghi.

Colore del corpo bruno; il capo e il gastro, esclusa la sua base, sono piuttosto bruno-picei.

Hab.: Tunisia, Tripolitania, Cirenaica, Egitto, Palestina e Siria.

36. Monomorium subopacum subsp. nitidiventre Em.

Monomorium bicolor nitidiventre Emery, Deutsche Ent. Zeit., 1908, pag. 677.
Monomorium subopacum st. *nitidiventre* Santschi, Bull. et Ann. Soc. Ent. Belgique, 1927, pag. 245.
Monomorium bicolor nitidiventre Karawaiew, Revue russe d'Ent., 1911, pag. 5.

☿ Helouan, 23.2.1933; ☿♀ Cairo (Piramidi), 18.1.1933; ☿ Cairo

(Meadi), 24.7.1933; ☿ Kirdassah, 28.3.1933; ☿ Oasi di Siwah, 26.3.1933; ☿♀ Barrage, 10.9.1933; ☿ Assuan, 14.2.1933; ☿ Cairo, XI.1930 (leg. Andres); ☿ Kom Ombo, XI.1930 (leg. Andres).

Hab.: Egitto, Cipro, Aden, Rodesia.

37. Monomorium subopacum bicolor var. rufibasis Santschi

La varietà descritta da Santschi (Boll. Lab. Zool. Portici, 1914, pag. 353) su ☿☿ del « Haute Egypte » dovrebbe avere « gastre sans reflet, la base un peu roussâtre ». Non ho veduto alcun esemplare.

Hab.: Alto Egitto, Sudan.

38. Monomorium subopacum bicolor var. subnitida Emery

Nel Boll. Soc. vaud. Sc. Nat., 1908, pag. 13, Forel cita questa varietà su ☿☿ e ♀♀ raccolte ad Ismailia e ne descrive il ♂.

Hab.: Algeria meridionale, Egitto, Transcaspio.

39. Monomorium gracillimum F.Sm.

Monomorium gracillimum Emery, Deutsche Ent. Zeit., 1908, pag. 669.

Numerosi esemplari provenienti dalle seguenti località: ☿ Asyut, 31.1.1933; ☿ Meadi (Cairo), 14.7.1933; ☿ Wadi Hoff, 27.1.1935; ♀ deal. ☿ Helouan, 23.3.1935 (☿☿ di varia grandezza; 1,6-2,3 mm. e di differente colorazione: da giallo fino a giallo-bruno scuro); ☿ Alessandria (Delta), 16.1.1933; ♀ alate Cairo (Gizeh), 16.2.1933; ♀♂☿ Cairo, X.1930 (leg. Andres).

Hab.: Barberia, Egitto, Siria, Palestina, Arabia, India, Asia centrale.

40. Monomorium bodenheimeri Menozzi

Questa specie affine al *Mon. chobauti* e al *Mon. lameerei* venne descritta dall'amico Menozzi sopra un'☿ raccolta a Wadi Tarfa (Sinai) — vedi Ergebnisse der Sinai-Expedition 1927, etc. — Leipzig, 1929, pag. 125.

Hab.: Sinai.

41. Solenopsis orbula subsp. kochi nov.

☿. — Capo più lungo che largo con i lati arcuati, con occhi piccolissimi. Solco meso-epinotale impresso. Del resto come la var. *terniensis*.

L. 2 mm.

♀ alata. — Capo un po' più lungo che largo, con i lati arcuati e l'occipite piuttosto diritto. Occhi situati verso le mandibole. Area frontale stretta prolungata all'indietro, continua quasi nella linea frontale che raggiunge l'ocello mediano. Lo scapo, ripiegato all'indietro, non raggiunge l'occipite.

Torace più lungo e soprattutto più depresso che quello della ♀ della *S. fugax;* nel punto della sua maggior larghezza, più stretto del capo. Scudo del mesonoto diritto; epinoto arcuato.

Peziolo di profilo distintamente peduncolato, col nodo arrotondato superiormente; postpeziolo cuneiforme.

Tutto il corpo liscio e lucido, coperto di fitta peluria aderente.

Capo e torace bruno-picei; mandibole, peduncoli, gastro giallo-bruni; antenne ed estremità gialle.

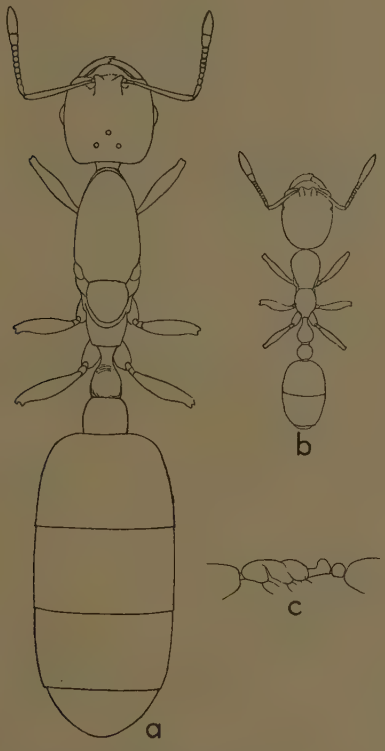

Fig. 8.

Solenopsis orbula subsp. *kochi* nov.:

(a) ♀ di sopra,

(b) ☿ di sopra,

(c) ☿ di profilo.

Ali assai leggermente giallastre.

L. 5,5 mm. Ala anteriore 5 mm.

♂. — Capo tanto largo quanto lungo, con i lati assai arrotondati, liscio e lucido. Del resto caratteri della rispettiva ♀. Tutto il corpo liscio e lucido, coperto di fitta pubescenza aderente.

Tutto il corpo piceo. Mandibole, funicolo e zampe rossastre.

L. 4 mm. Ala anteriore 3 mm.

Le ☿☿ provengono da Soloum, 23.3.1933; le ♀♀ e i ♂♂ da Helouan, 27.3.1933. Una ♀ venne raccolta a Ikingi Mariout, 18.3.1935 ed altre al Cairo, 12.2.1933. Questa razza si distingue dalla specie tipica e dalla var. *terniensis* per la grandezza delle ♀♀ e soprattutto delle ☿☿. In tutto il gruppo *latro* e *orbula* nessun'operaia raggiunge i 2 mm.

Hab.: Egitto.

42. Solenopsis lou Forel

Solenopsis lou Emery, Deutsche Ent. Zeitsch., 1909, pag. 35.

Una serie di ♂♂ raccolta a Helouan, 13.3.1935.

Hab.: Algeria meridionale, Tunisia, Egitto.

43. Leptothorax angulatue Mayr

Leptothorax angulatus Mayr, Zool.-bot. Gesell. Wien, 1862, pagg. 739-740.
Leptothorax angulatus Menozzi, Atti Soc. Nat. e Mat. di Modena, 1935, pag. 6.
Leptothorax angulatus Forel, Revue Suisse Zool., 1913, pag. 433.

Alcune ☿☿ raccolte a Wadi Hebran (Sinai), 6.3.1935. A Meadi (Cairo), 2.8.1933, venne raccolta un'unica ♀ dealata.

♀. L. 4 mm.

Tutta gialla, esclusa la clava, gli occhi, lo spazio triangolare tra gli ocelli e il postscutello che sono picei. Capo largo quanto il torace, circa un terzo più lungo che largo, con i lati e l'occipite diritti; angoli occipitali appena accennati; rugoso-striato ed opaco.

Torace con rugosità superficiale; lo scudo del mesonoto è un po' lucido. Epinoto con spine triangolari. Peduncoli, gastro e pelosità come nella rispettiva ☿.

Hab.: Tunisia, Sinai, Uganda centrale, Rodesia.

44. Leptothorax (subgen. Temnothorax) spec.

Due ☿☿ raccolte a Soloum, 23.3.1933, che non riesco a determinare con sicurezza, ma che appartengono indubbiamente al sottogenere *Temnothorax*.

Sono di color giallo-pallido uniforme; gli occhi neri hanno il diametro lungo un terzo dei lati del capo, collocati verso le mandibole. Occipite e lati del capo leggermente arcuati. Capo rugoso ma lucido, più largo del torace. Solco meso-epinotale impresso. Spine ben sviluppate, acute, con base stretta, lunghe almeno quanto la loro distanza basale. Torace rugoso ed opaco. Peziolo pedunculato con nodo acuto. Il postpeziolo, di sopra, ha la forma d'un trapezio col lato superiore arcuato. Gastro liscio e lucido; peziolo opaco e un po' rugoso; postpeziolo lucido.

Tetramorium Mayr

Per determinare i *Tetramorium* egiziani ho seguito: per il gruppo *punicum-biskrensis* il lavoro di Emery del 1925 (Notes critiques de Myrmecologie, Ann. et Bull. de la Soc. Ent. Belg., pagg. 177-191) e quello di Santschi del 1921 (Le *Tetramorium cæspitum* st. *semilaeve* et ses variétés, Real Soc. Espan. Hist. Nat. pagg. 428-434). Per le altre specie ho usato la revisione pubblicata da Emery nel 1909 (Deutsche Ent. Zeit., pagg. 695-706).

A parte il *Tetr. simillimum*, il vasto materiale va diviso in due gruppi:

1) *Tetr. biskrensis* var. *debilis*;

2) *Tetr. punicum* s.s. e la var. *sahlbergi*.

Le poche ♀♀ avute in esame non mi hanno aiutato a chiarire molti dubbi. I caratteri differenziali delle ☿☿ variano assai; nella tabella che segue ho preso in considerazione soltanto i più costanti. La stessa va presa perciò con molta riserva. Osservo ancora che le ♀♀ del gruppo *semilaeve* e *punicum* non offrono particolari morfologici tali da esser divise con sicurezza; ambedue hanno il torace depresso e più o meno piano nel profilo, mentre, visto dall'alto in tutte due le specie il pronoto sporge lateralmente dal mesonoto. Dal confronto col materiale esistente nella mia collezione, come si vedrà più sotto, i *Tetramorium* egiziani appartengono però indubbiamente alle forme mediterraneo-orientali del *punicum* e *biskrensis*.

45. Tetramorium simillimum F.Sm.

Tetramorium simillimum Emery, Deutsche Ent. Zeit. 1909, pag. 696.

Un'unica ♀ dealata raccolta a Meadi, 28.1.35.

Hab.: Cosmopolita.

46. Tetramorium biskrensis var. debilis Emery

Tetramonium caespitum var. *debilis* Emery, Deutsche Ent. Zeit., 1909, pag. 701.
Tetramorium biskrensis var. *debilis* Emery, Ann. et Bull. Soc. Ent. Belgique, 1925, pag. 182.

Ascrivo a questa varietà una serie di ☿☿ e ♀♀ alate raccolte al Cairo (Piramidi), 19.1.1933, e ad Asyut, 3.2.1933.

Le ♀♀ sono lunghe 4 mm., un po' più piccole del tipo di Emery (5 mm.). Hanno il torace depresso col mesonoto diritto; il pronoto, visto dall'alto, sporge lateralmente ai lati del mesonoto. Il torace, visto di profilo, corrisponde alla figura disegnata dall'Emery nel suo lavoro del 1925 (pag. 184, fig. A6). Postpeziolo largo mezza volta più del peziolo.

Capo striato fittamente; torace pure, eccetto la parte antero-mediana della scudo del mesonoto che è liscia e lucida. Parte superiore dei peduncoli liscia o con striatura trasversale appena accennata. Gastro liscio e lucido.

Tutta picea con le mandibole, funicolo, tarsi, trocanteri, giallo-carichi.

Le ☿ ☿ hanno il capo tutto striato, mentre il torace è leggermente rugoso; le spine epinotali sono piccole, dentiformi. I peduncoli sono lisci e lucidi nella parte superiore, rugosi ai lati. Color bruno-ferrugineo più o meno scuro, col funicolo, mandibole, base del gastro, tarsi, gialli.

L'esemplare determinato per *Tetr. caespitum* nel 1911 da Karawaiew (pag. 8) va probabilmente riferito alla var. *debilis*.

Hab.: Egitto.

47. Tetramorium punicum F.Sm.

Tetramorium caespitum punicum Emery, Deutsche Ent. Zeit., 1909, pag. 704.
Tetramorium caespitum punicum Emery, Ann. et Bull. Soc. Ent. Belgique, 1925, pag. 184.

Le ☿ ☿ del *punicum* s.s. sono di color bruno-ferrugineo più o meno uniforme; hanno il capo con striatura assai poco distinta in modo da risultare lucido o sublucido; il torace più o meno striato e sublucido; peduncoli lisci e lucidi. Gli esemplari (☿ ☿) che determino come appartenenti alla specie tipica provengono dal Cairo (Wadi Hof), 21.2.1933, dal Cairo (Massara), 25.1.1933, da Karun, 27.1.1933, e da Wadi Digla, 24.2.1933.

A Wadi Feran (Sinai), 4.3.1935, vennero raccolte 2 ☿ ☿, 2 ♀ ♀ dealate ed un ♂ che descrivo:

♂. — L. 5 mm.; ala anteriore 6 mm.

Capo subquadrato con l'occipite diritto e i lati leggermente arcuati, rugoso-striato ed opaco. Parte anteriore del mesonoto e scutello piuttosto lucidi; il resto del torace striato. Epinoto con due rilievi ottusi al posto delle spine. Peduncoli piuttosto lisci e sublucidi. Gastro liscio a lucido. Pelosità aderente, molto scarsa.

Colore piceo con le antenne, mandibole, tibie e tarsi gialli. Ali ialine con venatura e pterostigma giallo-chiare.

Hab.: Egitto, Sinai, Siria, Palestina, Russia. S.E.

48. Tetramorium punicum var. sahlbergi Forel

Tetramorium caespitum punicum var. *sahlbergi* Forel, Revue Suisse Zool., 1913, pag. 431.

La var. *sahlbergi* comprende le ☿ ☿ di color bruno scuro, sovente quasi nero, con il capo liscio e lucidissimo. Quest'ultimo può esser alle volte striato ma assai superficialmente anche in esemplari provenienti dallo stesso nido. Lo stesso si può dire per il pro- e mesonoto. L'épinoto è invece sempre rugoso. Spine epinotali più o meno ridotte. Peduncoli lisci.

☿ ☿ da Helouan, 23.1.1935; Alessandria (Mex), 11.1.1933; Marsa Matrouh, 13.3.1935; ☿ ♀ dealata Ikingi Mariout, 14.3.1935; ☿ ♀ alata Heliopolis, X.1930 (leg. Andres); ☿ ♀ alata Soloum, 24.3.1933.

♀. — L. 4 mm. Ala anteriore 5 mm.

Capo senza le mandibole tanto largo quanto lungo, un po' ristretto davanti, con striatura distinta e regolare.

Di profilo torace depresso, col mesonoto diritto, spine epinotali robuste. Di sopra il pronoto sporge dai lati del mesonoto. Parte anteriore del mesonoto e scutello lisci e lucidi; il resto del torace striato.

Peduncoli lisci o quasi e lucidi. Postpeziolo largo mezza volta il peziolo. Gastro liscio e lucido.

Pelosità fine, aderente, scarsa e corta.

Corpo di color bruno-nero uniforme col funicolo, mandibole e tarsi giallastri.

La descrizione della ♀ è fatta sopra l'esemplare raccolto a Heliopolis.

Hab.: Egitto, Siria.

Tabella delle ☿ ☿ dei *Tetramorium* egiziani:

1. Le lamine frontali, allungate all'indietro, oltrepassano gli occhi .... *simillimum*

— Le lamine frontali molto più corte 2

2. Striatura del capo profonda e uniforme, torace tutto rugoso, impressione meso-epinotale marcata ..... *biskrensis* var. *debilis*

— Striatura del capo appena accennata o del tutto mancante, pro- e mesonoto lucidi o sublucidi, impressione meso-epinotale indistinta o quasi 3

3. Esemplari di color bruno-ferrugineo più o meno chiaro .. *punicum* s.s.

— Esemplari bruni fino a picei ..... *punicum* var. *sahlbergi*

49. Strumigenys membranifera var. santschii Forel

Strumigenys membranifera var. *santchii* Santschi, Bull. Soc. Ent. de France, 1913, pag. 258.

Attribuisco con tutte le riserve a questa forma 2 ♀♀ raccolte una a Meadi (Cairo), 25.9.1933, l'altra a Barrage, 12.9.1933.

Hab.: Tunisia, Egitto (?)

Subfam. Dolichoderinae

50. Tapinoma simrothi var. phoenicea Emery

Tapinoma simrothi var. *phoenicea* Emery, Revue Suisse Zool., 1925, pagg. 50-51.

☿ ☿ Alessandria (Mex), 15.1.1933; ☿ ☿ ♂ ♂ Marsa Matrouh, 19.3.1933; ☿ ☿ Barrage, 10.9.1933; ☿ ☿ Cairo (Piramidi), 27.7.1933.

Gli esemplari egiziani corrispondono esattamente a quelli provenienti da Micene (Grecia) della mia collezione, studiati a suo tempo dall'Emery.

Credo che le *Tapinoma* determinate per *T. nigerrimum* dal Karawaiew (l.c. 1911, pag. 9) e quelle dell'elenco dell'Alfieri (l.c. 1931, pag. 46) debbono esser ascritte a questa razza della *T. simrothi*.

Hab.: Cipro, Damasco, Rodi, Micene, Jaffa, Egitto.

Subfam. Formicinae

51. Plagiolepis pallescens var. ancyrensis Santschi

Plagiolepis maura var. *ancyrensis* Santschi, Bull. Soc. vaud. Sc. natur., 1920, pag. 171.
Plagiolepis pallescens var. *ancyrensis* Emery, Ann. Soc. Ent. Belg., 1921, pagg. 313-315.
Plagiolepis pygmaea Alfieri, Bull. Soc. Roy. Entom. d'Egypte, 1931, pag. 47.

Le *Plagiolepis* egiziane appartengono tutte più o meno distintamente alla var. *ancyrensis* descritta da Santschi su esemplari di Angora (Asia minore). Le ☿☿ provenienti da Tor (Sinai), 26.2.35, hanno i lati del capo un po' meno arcuati; in ciò differiscono, ma in modo assai leggero, dalle altre e dalla figura disegnata dal dott. Santschi (l.c. pag. 167, fig. F).

☿☿ Piramidi (Cairo), 29.9.1933; ☿☿ Meadi, 29.1.1935; ☿ Birquach, 17.1.35; ☿♀♂ Alessandria (Mex), 3.4.33; ☿♀ Soloum, 24.3.33; ☿☿ Wadi Hoff, 8.3.33; ☿ Marsa Matrouh, 20.3.33; ☿♀ Sakkarah (Cairo), 19.3.33; ☿ Wadi Abu Tog (Sinai), 3.3.35; ☿ Wadi Feran (Sinai), 4.3.35; ☿ Wadi Isla (Sinai), 28.2.35.

I ♂♂ sono uguali a quelli della forma tipica provenienti dall'isola di Lemnos e da me descritti a suo tempo (Sitz.-Ber. der Akad. der Wissensch. Wien, 1928, pag. 790).

Hab.: Isole dell'Egeo, Asia Minore, Palestina, Sinai, Egitto.

52. Plagiolepis pallescens maura var. atlantis Santschi

Plagiolepis maura var. *atlantis* Santschi, Bull. Soc. vaud. Sc. Nat., 1920, pag. 171.

Riferisco con dubbio a questa varietà un'unica ☿ raccolta nell'oasi di Siwah — 23.3.33. L'esemplare ha la testa più stretta di quella della var. *ancyrensis*; i suoi lati sono distintamente meno arcuati. Lo scapo oltrepassa di poco l'occipite. Il corpo è lucido, giallo bruno con lo scapo e le zampe giallo-grigiastre. L. 1,5 mm.

Hab.: Algeria, Tunisia, Tripolitania, Cirenaica, Egitto.

53. Acantholepis frauenfeldi var. aegyptiaca nov.

Le ☿☿ si distinguono dalla specie tipica della Dalmazia per la forma della testa che ha i lati anteriori meno convergenti in avanti ed è ben più

stretta in modo da risultare appena di un quarto più larga del torace. Nella *frauenfeldi* s.s. il capo è piuttosto ovale; nella var. *aegyptiaca* risulta allungato nella sua porzione anteriore. La parte superiore della squama è leggermente incisa; in ogni caso molto meno che nella specie tipica. Del resto è uguale, sia nel colore, come nella scultura e lucentezza del tegumento, nella distribuzione della scarsa pelosità e nella forma del torace.

L. 2,3 mm.

Una piccola serie di ♂♂ raccolte a Wadi Hoff, 5.3.1933.

Hab.: Egitto.

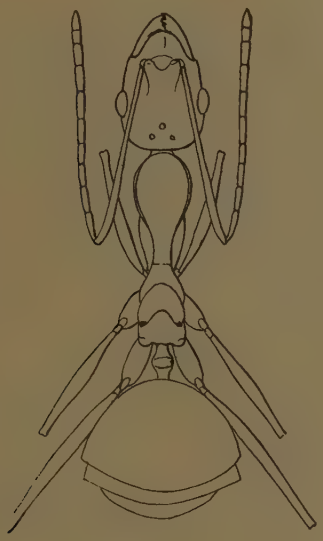

Fig. 9.

Acantholepis frauenfeldi

var. *aegyptiaca* nov.:

♂ di sopra.

51. Acantholepis frauenfeldi var. syriaca André

Acantholepis frauenfeldi var. *syriaca* André, Spec. Hym. Europe, 1882, pag. 211.
Acantholepis frauenfeldi var. *syriaca* Santschi, Bull. Soc. Hist. Nat. Afr. Nord, 1917, pag. 42, 46.

Parecchie ♂♂ e ♀♀ raccolte ad Alessandria (Mex), 11.1.1933.

La ♀ dealata è lunga circa 5 mm. Ha il corpo totalmente opaco; la testa e il torace con fine e densa microscultura e il gastro sericeo. Pochi peli eretti sparsi sulla parte mediana della testa, sullo scutello, sull'epinoto e ai margini dei segmenti del gastro. Lo scutello è rossiccio; le zampe e il funicolo bruni; lo scapo, i tarsi, i femori anteriori, le mandibole rosse; il resto del corpo è bruno-grigiastro. La squama ha la sua parte superiore incisa, ma non profondamente.

Une serie di ♀♀ dealate, raccolte a Soloum, 23.3.933, sono identiche a quelle di Alessandria.

Hab.: Siria, Palestina, Egitto.

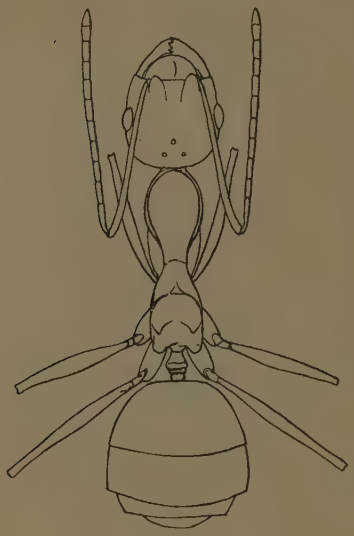

Fig. 10.

Acantholepis frauenfeldi

var. *syriaca* André:

☿ di sopra.

55. Acantholepis frauenfeldi var. nigra Emery.

Nell'elenco delle formiche del Sinai (Ergeb. der Sinai-Exped., Leipzig, 1929, pag. 128) il collega Menozzi cita questa varietà sopra un'operaia raccolta a Wadi Tarfa.

Hab.: Italia meridionale, Dalmazia, Grecia, Sinai (?).

56. Acantholepis frauenfeldi var. splendens Karawaiew.

Acantholepis frauenfeldi var. *splendens* Karawaiew, Revue Russe d'Ent., 1912, pag. 6.

Acantholepis frauenfeldi var. *splendens* Santschi, Bull. Soc. Hist. Nat. Afr. Nord, 1917, pag. 47.

Ho confrontato una serie di ☿☿ raccolte a Heliopolis, XI.1930, ed inviatemi dal Andres, con un tipo di Creta. Sono identici.

Le ☿☿ sono tutte nere, ad eccezione di parte del mesonoto che è rossicio e dei tarsi, femori, mandibole ed antenne che sono giallo-rossiccie.

Hab.: Corfù, Creta, isole dell'Egeo, Egitto.

57. Acantholepis frauenfeldi var. opaciventris nov.

☿. L. 2,8 mm.

Tutta nera ed opaca, ad eccezione della parte superiore del mesonoto lucido; tibie, tarsi, mandibole ed antenne gialle.

Il gastro sericeo con riflessi bluastri. Squama incisa nella sua parte superiore circa come nella subsp. *bipartita;* epinoto assai debolmente spinoso. Capo allungato con i lati anteriori sub-paralleli e poco più largo del torace. I pochi peli eretti sono sparsi sul capo e ai margini dei segmenti del gastro.

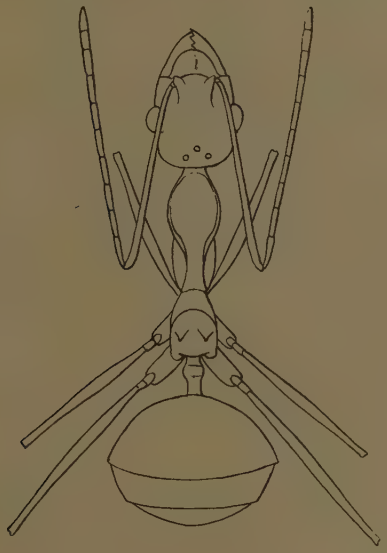

Fig. 11.

Acantholepis frauenfeldi

var. *opaciventris* nov.:

☿ di sopra.

Alcune ☿☿ raccolte a Wadi Isla (Sinai), 28.2.35. Questa bella varietà, distinta da tutte le altre per avere il gastro sericeo, va unita a mio avviso al gruppo *bipartita-sericea* dell'Indostan. Per la forma del capo invece si avvicina alla var. *aegyptiaca* mihi.

Hab.: Sinai.

58. Acantholepis gracilicornis Forel

La specie à citata da Karawaiew (Revue Russe d'Ent., 1911, pag. 9) su ☿☿ raccolte ad Assuan.

Hab.: Aden, Egitto.

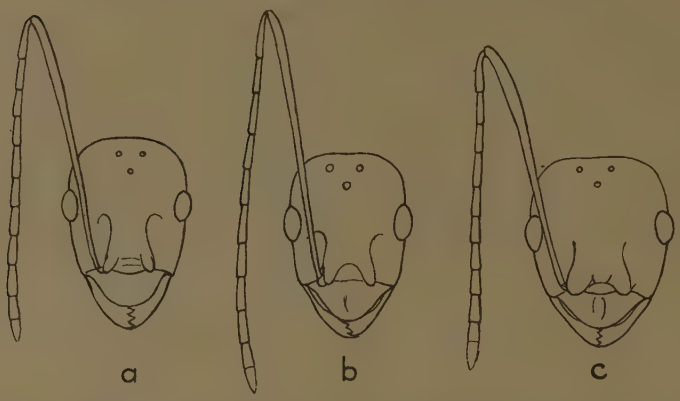

Fig. 12. — (a) *Acantholepis frauenfeldi* var. *aegyptiaca* nov.; (b) *Acantholepis frauenfeldi* var. *opaciventris* nov.; (c) *Acantholepis frauenfeldi* var. *syriaca* André : capi di sopra.

Tabella delle ☿☿ delle *Acantholepis* egiziane

1. Lo scapo oltrepassa l'occipite di almeno due terzi della sua lunghezza. Coscie posteriori più lunghe del torace ..... *gracilicornis*

— La scapo oltrepassa l'occipite della metà o un po' più della sua lunghezza. Coscie posteriori più corte del torace 2

2. Gastro opaco, sericeo, con riflessi bluastri ..... var. *opaciventris*

— Gastro lucido 3

3. Lati anteriori del capo sub-paralleli in modo ch'esso risulta allungato e poco più largo del torace ..... var. *aegyptiaca*

— Lati anteriori del capo convergenti verso le mandibole in modo ch'esso risulta ovale o quasi e ben più largo del torace 4

4. Mesonoto rossiccio, torace e testa sublucidi ..... var. *syriaca*

— Tutta nera e assai lucida 5

5. Squama larga (tipo *bipartita*). Nel punto della massima larghezza raggiunge oltre il doppio della distanza che corre tra le punte dell'incavatura superiore ..... var. *nigra*

— Squama stretta ; nel punto della massima larghezza raggiunge molto meno del doppio della distanza che corre tra le punte dell'incavatura superiore ..... var. *splendens*

59. Camponotus compressus thoracica var. fellah Emery

Camponotus maculatus thoracica var. *fellah* Emery, Deutsche Ent. Zeit., 1908, pag. 194.
Camponotus compressus thoracica var. *fellah* Emery, Gen. Ins., 1925, pag. 99.

☿♂ Alessandria (Mex), 3.4.1933; ☿ Wadi Hoff, 8.3.1933; ☿ Marsa Matrouh, 20.3.1933; ☿ Cairo, 21.1.1933; ☿ Helouan (W. Garrawi), 8.9.1933; ☿♂ Gebel Asfar, 19.9.1933; ♀♂ Cairo, 20.3.1933; ♀☿ Oasi di Siwah, 24.3.1933; ☿ Soloum, 23.3.1933; ☿ Heliopolis, X.1930 (leg. Andres); ♀☿ Wadi Feran (Sinai), 4.3.1935; ☿ Wadi Isla (Sinai), 4.3.1935; ♀☿ Tor (Sinai), 27.2.1935; ☿ Wadi Cheikh, 3.3.1935.

A Wadi Hoff furono raccolti alcuni 4 4 lunghi ben 16 mm.

Il ♂ è totalmente nero; soltanto i tarsi e il funicolo sono rossastri. Ali giallo-brune.

Hab.: Egitto, Sinai, Palestina, Siria.

60. Camponotus compressus thoracica var. xerxes Forel

Karawaiew (Revue russe d'Ent., 1911, pag. 11) raccolse la varietà nei dintorni di Cairo. Ho esaminato alcuni 4 4 e ☿☿ del Caucaso; sono assai affini alla var. *fellah*. Confrontando gli esemplari massimi che dovrebbero avere i caratteri più costanti, noto che le differenze morfologiche sono insignificanti.

Hab.: Asia centrale e occidentale, Egitto (?)

61. Camponotus maculatus subsp. aegyptiaca Emery

Camponotus maculatus subsp. *aegyptiaca* Emery, Bull. Soc. Ent. France, 1915, pag. 79.
Camponotus maculatus maculatus F., part., Emery, Deutsche Ent. Zeit., 1908, pag. 191.
Camponotus maculatus subsp. *aegyptiaca* Emery, Gen. Ins., 1925, pag. 87.

Numerose 4 4 raccolte ad Asyut, 5.2.1933; W. Halfa (Sudan), 12.2.1933; Sakkarah (Cairo), 19.2.1933; Meadi, 19.7.1933; Cairo, 29.9.1933; Heliopolis, X.1930 (leg. Andres). Alcuni ♂♂ provengono da Helouan, 15.7.1933, e da Asyut, 2.2.1933.

Il ♂ è totalmente giallo, salvo lo spazio triangolare racchiuso dagli occelli, due fascie laterali sul mesonoto e il margine inferiore dei tre primi tergiti del gastro che sono leggermente bruni. L. 7 mm.

I *Camp. maculatus* determinati da Forel (Bull. Soc. vaud. Sc. Nat., 1908, pag. 16) e da Karawaiew (Revue russe d'Entom., 1911, pag. 10) vanno riferiti certamente alla subsp. *aegyptiaca*.

Hab.: Cirenaica, Egitto, Bacino del Nilo.

62. Camponotus rufoglaucus var.

Un' ☿ di Hamman, 15.3.1935 che puo' esser riferita ad una delle tante varietà del *rufoglaucus*.

63. Camponotus sericeus F.

Camponotus sericeus Mayr, Verh. zool.-bot. Gesell. Wien, 1862, pag. 675, fig. 4.
Camponotus sericeus F., Emery, Gen. Ins., 1925, pag. 125.

☿☿ Oasi di Siwah, 26.3.1933.

Hab.: Africa tropicale, Cirenaica, Egitto, Arabia, Indostan, Indocina, Ceylon.

Tabella delle ☿☿ dei *Camponotus* egiziani:

1. Gastro coperto di fittissima pubescenza aderente in modo da farlo apparire sericeo splendente; di profilo la faccia dorsale dell'epinoto è nettamente staccata da quella discendente; quest'ultima è incavata nel mezzo ..... *sericeus*

— Gastro con peli lunghi sparsi più o meno abbondantemente al margine dei tergiti; di profilo la faccia dorsale dell'epinoto continua in quella discendente in curva quasi continua 2

2. 4 4. Gastro con alcune macchie gialle disposte ai lati; torace di solito giallo; peli al margine dei tergiti gastrali più numerosi; pronoto di solito più lucido; capo di sotto con alcuni peli eretti .... *maculatus aegyptiaca*

— 4 4. Gastro bruno; torace del colore del gastro o leggermente più chiaro; peli al margine dei tergiti gastrali meno numerosi; pronoto di solito opaco; capo di sotto senza peli eretti ..... *compressus thoracica fellah*

64. Polyrhachis simplex Mayr.

Polyrhachis simplex Bingham, Fauna Brit. India, Hym., Vol. 2, 1903, pagg. 384, 394.

Una serie di ☿☿ raccolte a Wadi Feran (Sinai) il 4.3.1935.

Hab.: Birmania, Indostan, Ceylon, Mesopotamia, Palestina, Transgiordania, Sinai.

65. Paratrechina jaegerskjoeldi Mayr.

Prenolepis jaegerskjoeldi Mayr, Res. Swed. Zool. Exp., 1905, pag. 8.
Prenolepis jaegerskjoeldi Karawaiew, Revue russe d'Ent., 1911, pag. 9.
Paratrechina jaegerskjoeldi Alfieri, Bull. Soc. Roy. Ent. d'Egypte, 1931, pag. 47.

Numerosi esemplari raccolti a: ☿♀♂, Helouan, 2.3.1933; ☿♂♀ Alessandria (Mex), 3.4.1933; ☿ Oasi di Siwah, 26.3.1933; ☿ Gebel Asfar (Cairo),

12.3.1933 ; ☿ ♀ ♂ Ismaila, 17.4.1933 ; ♀ Marsa Matrouh, 19.3.1933 ; ☿ Cairo, 18.2.1933 ; ☿ Meadi (Cairo), 2.8.1933 ; ☿ Atar El Nabi, 8.7.1933.

Hab. : Egitto, Siria, Cipro, Rodi.

66. Paratrechina longicornis Latr.

Prenolepis longicornis André, Ann. Soc. Ent. France, 1881, pag. 60.
Paratrechina longicornis Alfieri, Bull. Soc. Roy. Ent. d'Egypte, 1931, pag. 47.

Una serie di ☿ ☿ raccolte a Kom Ombo, XI.1930 ed inviatemi da Ad. Andres.

Hab. : Cosmopolita.

***

Per distinguere le ☿ ☿ delle due *Paratrechina* dell'Egitto varrà la seguente tabella :

Scapo lungo per lo meno due volte il capo ..... *P. longicornis*
Scapo molto più breve ..... *P. jaegerskjoeldi*

67. Lasius niger subsp. lasioides Emery

Questa formica è stata raccolta secondo Forel (Revue suisse Zool., 1913, pag. 434) a Fajum. Nessun altro Autore l'ha mai citata dall'Egitto e in genere dal Nord Africa.

Hab. : Europa meridionale, Egitto (?)

68. Cataglyphis albicans Roger.

Myrmecocystus albicans Forel, Bull. Soc. vaud. Sc. Nat., 1908, pag. 14.
Myrmecocystus albicans Karawaiew, Revue russe d'Ent., 1911, pag. 10.
Cataglyphis albicans Santschi, Revue suisse Zool., 1929, pag. 37.

Gli esemplari esaminati provengono da : ☿ Cairo (Massara), 25.1.1933 ; ☿ Heluan, 25.3.1933 ; ☿ Marsa Matrouh, 17.3.1933 ; ☿ Gebel Asfar (Cairo), 19.9.1933.

Le ☿ ☿ sono uniformemente bruno-picee con le mandibole, lo scapo, i primi articoli del funicolo, le tibie e i tarsi di color giallo-rossiccio. Tutto il corpo è sublucido ; il tegumento porta una finissima e densa striatura. I peli sono pochissimi sparsi sul clipeo, occipite, epinoto e sui margini dei segmenti del gastro.

Gli esemplari egiziani sono identici a quelli provenienti da Tunisi che conservo nella mia collezione.

Hab. : Algeria, Tunisia, Cirenaica, Egitto.

69. Cataglyphis albicans subsp. livida André.

La razza è citata da Menozzi (Ergebnisse der Sinai-Expedition 1927, ecc., 1929, pag. 128) su ☿☿ raccolte a Wadi Nasib (Sinai) e da Alfieri (Bull. Soc. Roy. Ent. d'Egypte, 1931, pag. 47) su esemplari provenienti dalla provincia di Fayoum.

Hab.: Egitto, Sinai, Palestina, Siria, Transgiordania.

70. Cataglyphis albicans subsp. livida var. ambigua Santschi.

Santschi, Revue suisse Zool. 1929, pag. 40.

Corrispondono alla descrizione dell'Autore una ricca serie di ☿☿ ralccolte a: Wadi Hoff, 5.3.1933; Cairo (Sakkarah), 14.2.1933; El Rus, 28.1.1933; Meadi (Cairo), 11.7.1933; Ezbet El Nakl, 3.7.1933; Ismaila, 16.4.1933; Gebel Asfar, 19.9.1933; Wadi Feran (Sinai), 4.3.1935; Ain Suchna (Suez), 17.2.1935.

Hab.: Mauritania, Egitto, Sinai.

71. Cataglyphis albicans livida var. aurata Karawiew

Nella Rev. russe d'Ent., 1911, p. 10, Karawaiew descrisse la varietà *aurata* su ☿☿ raccolte a Shellal presso Assuan, Khartum e Port Sudan.

Hab.: Egitto, Cirenaica, Sudan.

*
* *

Forel in un lavoro pubblicato nel 1911 (Revue suisse de Zool., pag. 458) cita dal Cairo una var. *arenaria* del *Cat. albicans livida*. Secondo la revisione dei *Cataglyphis* fatta da Santschi nel 1929 (l.c. pag. 40) la var. *arenaria* proviene dall'Algeria.

72. Cataglyphis bicolor Fabr.

La specie s.s. è segnalata da Alfieri (1931, pag. 47). Tutti gli esemplari esaminati da me appartengono a varietà del *bicolor;* nessuno, alla specie tipica.

Hab.: Algeria, Tunisia, Cirenaica.

73. Cataglyphis bicolor nodus var. savignyi Dufour.

Cataglyphis bicolor nodus var. *savignyi* Santschi, Revue suisse Zool., 1929, pag. 45.

☿ Alessandria (Abukir), 14.1.1933; ☿ Cairo, 18.1.1933; ☿♀♂ Ismaila, 16.4.1933; ♀♂ Helouan, 7.4.1935; ☿ Oasi di Siwah, 27.3.1933; ☿ Heliopolis, 16.10.1930; ☿ Kom Ombo, XI.1930; ☿ Karun, 27.1.1933.

Hab.: Cirenaica, Egitto.

74. Cataglyphis bicolor nodus var. desertorum Forel.

Cataglyphis bicolor nodus var *desertorum* Santschi, Revue suisse de Zool., 1929, pag. 46.

Una serie di ☿ ☿ inviatemi a suo tempo dal Sig. Andres raccolte a Kom Ombo, X.1930, e Heliopolis, X.1930. Santschi (l.c.) cita la varietà su esemplari raccolti al Cairo.

Hab.: Egitto, Sud dell'Atlante e Sahara.

75. Cataglyphis bicolor subsp. nigra André.

Secondo Menozzi (1929, pag. 128) a Wadi Scheich e Wueste Kaa (Sinai).
Hab.: Cirenaica, Sinai, Palestina, Siria.

76. Cataglyphis bicolor nigra var. isis (Forel) Santschi.

Varietà descritta su ☿ ☿ di Heliopolis e Suez.
Hab.: Egitto.

77. Cataglyphis bicolor nigra var. pharao Santschi.

Cataglyphis bicolor nigra var. *pharao* Santschi, Revue suisse Zool., 1929, pag. 51.

☿ Wadi Feran (Sinai), 4.3.1935; ☿ Wadi Isla (Sinai), 28.2.1935; ☿ Ain Suchna (Suez), 17.2.1935.
Hab.: Egitto, Sinai.

78. Cataglyphis adenensis var. bugnioni Forel.

Varietà descritta su un'☿ di Suez. — Santschi (1929, pag. 41) la cita come proveniente anche da Gibuti.
Hab.: Egitto, Somalia francese.

79. Cataglyphis bombycina Roger.

Cataglyphis bombicina Santschi, Revue suisse, Zool., 1929, pag. 60.

☿ Abou Rouache, 9.3.1933; ☿ 4 W. Halfa, 12.2.1933; ☿ Karun, 27.1.1933; ☿ Assuan, 11.2.1933; ☿ 4 Oasi di Siwah, 26.3.1933; 4 Ismailia, 13.4.1933; ☿ Khatatbah, 9.4.1933; ☿ Tor (Sinai), 25.3.1935; 4 ☿ Kom Ombo, I.XI.1930.
Hab.: Zone deserte dell'Africa del Nord, Egitto.

80. Cataglyphis bombycina var. sinaitica Wheeler.

Varietà descritta e conosciuta soltanto dalla penisola del Sinai.

II. DISTRIBUZIONE GEOGRAFICA DELLE FORMICHE EGIZIANE

Ho detto nella breve introduzione a questo lavoro che le nostre conoscenze sulla fauna mirmecologica egiziana sono per ora discrete. L'elenco sin qui delineato avvalora la mia asserzione. Ottanta sono le formiche note sinora dall'Egitto e anch'esse distribuite tra specie, razze e varietà secondo il piano seguente:

GENERI	Specie	Razze	Varietà
1. *Ponera*	—	—	1
2. *Dorylus*	—	—	1
3. *Sima*	—	—	1
4. *Messor*	4	1	6
5. *Pheidole*	3	—	1
6. *Cardiocondyla*	—	2	4
7. *Crematogaster*	2	—	1
8. *Monomorium*	5	2	6
9. *Solenopsis*	1	1	—
10. *Leptothorax*	2	—	—
11. *Tetramorium*	2	—	2
12. *Strumigenys*	—	—	1
13. *Tapinoma*	—	—	1
14. *Plagiolepis*	—	—	2
15. *Acantholepis*	1	—	5
16. *Camponotus*	1	1	3
17. *Polyrhachis*	1	—	—
18. *Paratrechina*	2	—	—
19. *Lasius*	—	1	—
20. *Cataglyphis*	3	2	8
TOTALI.....	27	10	43

Fauna povera dunque; nemmeno lontanamente confrontabile con quella algero-tunisina; un po' più ricca della libica, ma minore leggermente per numero a quella palestinese.

Ritengo comunque utile un confronto delle formiche egiziane con quelle delle regioni vicine, perchè esso potrà gettare almeno le basi per future studi corologici. Le conclusioni a cui sono arrivato hanno il merito di basarsi su materiale esaminato e studiato personalmente. La conoscenza sistematica del gruppo, l'esattezza e la meticolosità della determinazione danno all'elenco l'attributo di « ragionato » nel vero e completo senso della parola. Del resto il non essermi limitato ad elencare, ma l'aver voluto rivedere pazientemente genere per genere, compilando per la loro quasi totalità la rispettiva tabella dicotomica, dimostra che le forme sono state studiate a fondo e che gli eventuali, inevitabili errori sono stati ridotti al minimo. Ogni singola citazione di altri autori, e sopratutto quelle dei lavori vecchi, è stata riveduta in senso

moderno; qualche raro punto interrogativo indica singoli dubbi sistematici derivati da mancanza o esiguità di materiale.

Il prospetto che segue riassume la diffusione delle formiche egiziane. Ho voluto segnare le regioni in senso molto largo e, per quanto riguarda l'Algeria e la Tunisia, così come sono intese comunemente nei cataloghi compilati finora. Ma chi ha dimestichezza con un qualsiasi gruppo d'insetti del Mediterraneo e del Sahara sa che: per esempio, l'Algeria costiera è tutt'altra cosa della meridionale; che la Siria del nord, faunisticamente parlando, non è la Siria del Sud. Ho ritenuto pertanto, data la mancanza di lavori riassuntivi e moderni sul Marocco, Algeria e Tunisia, di non distinguere nel prospetto che segue le zone desertiche meridionali di queste regioni da quelle nordiche. Ciò si potrà fare agevolmente in seguito disponendo di vaste collezioni e soprattutto dell'opera di pazienti ed oculati raccoglitori magari residenti sul posto.

In ogni caso, sulla scorta delle mie conoscenze, nella discussione ho diviso le formiche egiziane diffuse nell'Africa minore costiera da quelle della zona sahariana, dimostrando, come si vedrà, quanto sono fallaci o poco appropriate le indicazioni generiche « Algeria », « Tunisia » o simili.

Comunque più che conclusioni, quelle a cui sono arrivato hanno il valore di note indicative. Potranno forse leggermente variare in seguito; ma sono quelle alle quali si è giunti sulla base delle forme conosciute oggi.

SPECIE	Algeria	Tunisia	Tripolitania	Cirenaica	Egitto	Sinai	Palestina	Siria	Etiopiche	Circummediter.	Cosmopolite	Asia Occid.
1. *Ponera ragusae* var. *santschii*.	+	+			+	+	+	+				
2. *Dorylus fulvus* var. *punicus*					+	+	+					
3. *Sima bifoveolata* var. *syriaca* .						+						
4. *Messor aegyptiacus*	+	+	+	+	+							
5. *Messor aegyptiacus* var. *felah* .					+							
6. *Messor aegyptiacus* var. *foreli*	+	+	+			+						
7. *Messor arenarius*	+	+	+	+	+		+	+				
8. *Messor barbarus sahlbergi* ...				+								
9. *Messor minor aralocaspius* var. *tamerlani*				+								+
10. *Messor rugosus crawleji*				+								
11. *Messor rufotestaceus*	+				+	+	+					
12. *Messor semirufus maculifrons* .				+			+					+
13. *Messor semirufus ebeninus* ...					+		+	+				
14. *Messor structor*												
15. *Pheidole jordanica*				+	+		+					
16. *Pheidole pallidula arenarum recticeps*	+	+	+	+	+	+	?					
17. *Pheidole sinaitica*		+	+		+	+						
18. *Pheidole teneriffana*		+		+	+			+			+	
19. *Cardiocondyla elegans sahlbergi*					+		+					

SPECIE	Algeria	Tunisia	Tripolitania	Cirenaica	Egitto	Sinai	Palestina	Siria	Etiopiche	Circummediter.	Cosmopolite	Asia Occid.
20. *Cardiocondyla elegans torretassoi*					+	+						
21. *Cardiocondyla emeryi mahdii*					+				+			
22. *Cardiocondyla emeryi schatzmayri*					+							
23. *Cardiocondyla nuda fajumensis*					+							
24. *Cardiocondyla nuda mauritanica*	+	+		+	+		+					
25. *Crematogaster jehovae*						+	+	+				
26. *Crematogaster inermis*					+		+	+				
27. *Crematogaster inermis antaris nigripes*				+	+							
28. *Monomorium pharaonis*					+						+	
29. *Monomorium venustum nilotica*					+	+						
30. *Monomorium salomonis*			+			?	+					+
31. *Monomorium salomonis sommieri*	+	+		+	+	+						
32. *Monomorium salomonis obscurata*	+	+		+	+							
33. *Monomorium salomonis didonis*	+	+		+	+							
34. *Monomorium subopacum*	+	+			?							
35. *Monomorium subopacum phoenicia*		+	+	+	+		+	+				
36. *Monomorium subopacum nitidiventre*					+				+			
37. *Monomorium subopacum bicolor rufibasis*					+				+			
38. *Monomorium subopacum subnitida*	+				+							+
39. *Monomorium gracillimum*	+	+		+	+		+	+			?	+
40 *Monomorium bodenheimeri*						+						
41. *Solenopsis orbula kochi*					+							
42. *Solenopsis lou*	+	+			+							
43. *Leptothorax angulatus*		+				+			+			
44. *Leptothorax (Temnothorax)* spec.												
45. *Tetramorium simillimum*					+						+	
46. *Tetramorium biskrensis debilis*					+							
47. *Tetramorium punicum*				+	+	+	+	+				+
48. *Tetramorium punicum* var. *sahlbergi*					+			+				
49. *Strumigenys membranifera santschii*		+			+							
50. *Tapinoma simrothi phoenicea*					+	+	+					
51. *Plagiolepis pallescens ancyrensis*					+		+					
52. *Plagiolepsis pallescens maura atlantis*	+	+	+	+	+							
53. *Acantholepis frauenfeldi aegyptiaca*					+							
54. *Acantholepis frauenfeldi syriaca*					+		+	+				
55. *Acantholepis frauenfeldi nigra*						?						
56. *Acantholepis frauenfeldi splendens*					+							

SPECIE	Algeria	Tunisia	Tripolitania	Cirenaica	Egitto	Sinai	Palestina	Siria	Etiopiche	Circummediter.	Cosmopolite	Asia Occid.
57. *Acantholepis frauenfeldi opaciventris*						+						
58. *Acantholepis gracilicornis*					+							
59. *Camponotus compressus thoracica fellah*					+	+	+	+				
60. *Camponotus compressus thoracica xerxes*					?							
61. *Camponotus maculatus aegyptiaeu*				+	+							
62. *Camponotus rufoglaucus* var. ...					+							++
63. *Camponotus sericeus*				+	+							
64. *Polyrhachis simplex*						+	+					
65. *Paratrechina jaegerskjoeldi* ...					+			+				
66. *Paratrechina longicornis*					+						+	
67. *Lasius niger lasioides*					?							
68. *Cataglyphis albicans*	+	+	+	+	+							
69. *Cataglyphis albicans livida* ...						+	+	+				
70. *Cataglyphis albicans livida ambigua*					+	+						
71. *Cataglyphis albicans livida aurata*				+	+							
72. *Cataglyphis bicolor*	+	+	+	+	?							
73. *Cataglyphis bicolor nodus savignyi*				+	+							
74. *Cataglyphis bicolor nodus desertorum*	+	+			+							
75. *Cataglyphis bicolor nigra*				+		+	+	+				
76. *Cataglyphis bicolor nigra isis* ...					+							
77. *Cataglyphis bicolor nigra pharao*					+	+						
78. *Cataglyphis adenensis bugnioni*					+				+			
79. *Cataglyphis bombycina*	+	+		+	+	+						
80. *Cataglypis bombicina sinaitica*						+						

Analizzando il prospetto arriviamo alle conclusioni seguenti:

1. Forme endemiche

1. *Sima bifoveolata* var. *syriaca*.
2. *Messor aegyptiacus* var. *felah*.
3. *Messor barbarus* (?) subsp. *sahlbergi*.
4. *Messor rugosus* var. *crawleji*.
5. *Cardiocondyla elegans* var. *torre-tassoi*.
6. *Cardiocondyla emeryi* subsp. *schatzmayri*.
7. *Cardiocondyla nuda* var. *fajumensis*.
8. *Monomorium venustum* subp. *nilotica*.

9. *Monomorium bodenheimeri.*
10. *Solenopsis orbula* subsp. *kochi.*
11. *Tetramorium biskrensis* var. *debilis.*
12. *Acantholepis frauenfeldi* var. *aegyptiaca.*
13. *Acantholepis frauenfeldi* var. *opaciventris.*
14. *Acantholepis gracilicornis.*
15. *Cataglyphis bicolor nigra* var. *isis.*
16. *Cataglyphis bicolor nigra* var. *pharao.*
17. *Cataglyphis bombycina* var. *sinaitica.*

2. Forme cosmopolite o sulla via di diventarlo

1. *Pheidole teneriffana.*
2. *Monomorium pharaonis.*
3. *Monomorium gracillimum.*
4. *Tetramorium simillimum.*
5. *Paratrechina longicornis.*

3. Forme etiopiche

1. *Cardiocondyla emeryi* subsp. *mahdii.*
2. *Monomorium subopacum* subsp. *nitidiventre.*
3. *Monomorium subopacum bicolor* var. *rufibasis.*
4. *Leptothorax angulatus.*
5. *Cataglyphis adenensis* var. *bugnioni.*

4. Forme diffuse oltre le regioni paleartica ed etiopica

1. *Camponotus sericeus.*
2. *Polyrhachis simplex.*

5. Forme verosimilmente importate

1. *Messor structor.*

6. Forme circummediterranee, esistenti cioè in tutti i paesi bagnati dal Mediterraneo

Nessuna.

7. Forme conosciute da tutta l'Africa del Nord

1. *Ponera ragusae* var. *santschii* (x).
2. *Messor aegyptiacus*.
3. *Messor aegyptiacus* var. *foreli* (x).
4. *Messor arenarius*.
5. *Messor rufotestaceus* (x).
6. *Pheidole pallidula arenarum* var. *recticeps*.
7. *Pheidole sinaitica* (x).
8. *Cardiocondyla nuda* var. *mauritanica*.
9. *Monomorium salomonis* var. *sommieri*.
10. *Monomorium salomonis* var. *obscurata*.
11. *Monomorium salomonis* var. *didonis*.
12. *Monomorium subopacum* (x?).
13. *Monomorium subopacum* var. *phoenicia*.
14. *Solenopsis lou* (x).
15. *Plagiolepis pallescens maura* var. *atlantis*.
16. *Cataglyphis albicans*.
17. *Cataglyphis bicolor nodus* var. *desertorum*.
18. *Cataglyphis bombycina*.

Le forme segnate con (x) mancano in Cirenaica.

8. Forme della Cirenaica e dell'Africa nord-orientale

1. *Pheidole jordanica*.
2. *Crematogaster inermis antaris* var. *nigriceps*.
3. *Camponotus maculatus* subsp. *aegyptiaca*.
4. *Cataglyphis albicans livida* var. *aurata*.
5. *Cataglyphis bicolor nodus* var. *savignyi*.
6. *Cataglyphis bicolor* subsp. *nigra*.

9. Forme dell'Egitto e in genere del Mediterraneo orientale e dell'Asia occidentale

1. *Dorylus fulvus* var. *punicus*.
2. *Messor minor aralocaspius* var. *tamerlani*.
3. *Messor semirufus* var. *maculifrons*.
4. *Messor semirufus* var. *ebeninus*.
5. *Cardiocondyla elegans* var. *sahlbergi*.
6. *Crematogaster jehovae*.
7. *Crematogaster inermis*.

8. *Monomorium salomonis.*
9. *Monomorium subopacum bicolor* var. *subnitida* (conosciuta anche dall'Algeria meridionale).
10. *Tetramorium punicum.*
11. *Tetramorium punicum* var. *sahlbergi.*
12. *Tapinoma simrothi* var. *phoenicea.*
13. *Plagiolepis pallescens* var. *ancyrensis.*
14. *Acantholepis frauenfeldi* var. *syriaca.*
15. *Acantholepis frauenfeldi* var. *splendens.*
16. *Camponotus compressus thoracica* var. *fellah.*
17. *Camponotus compressus thoracica* var. *xerxes.*
18. *Paratrechina jaegerskjoeldi.*
19. *Cataglyphis albicans* subsp. *livida.*
20. *Cataglyphis albicans livida* var. *ambigua* (conosciuta anche dalla Mauritania — Trarza e Meserdra).

10. Forme di determinazione dubbia o di distribuzione geografica poco conosciuta

1. *Leptothorax* (*Temnothorax*) spec.
2. *Strumigenys membranifera* var. *santschii.*
3. *Camponotus rufoglaucus* var.
4. *Lasius niger* subsp. *lasioides.*
5. *Acantholepis frauenfeldi* var. *nigra.*
6. *Cataglyphis bicolor.*

Esaminando i dati contenuti negli elenchi delle forme divise per regioni arriviamo ai seguenti risultati:

1. Forme endemiche	No. 17	21,25 %
2. Forme cosmopolite o sulla via di diventarlo	5	6,25 %
3. Forme etiopiche	5	6,25 %
4. Forme diffuse oltre le regioni paleartica ed etiopica	2	2, 5 %
5. Forme importate	1	1,25 %
6. Forme circum-mediterranee ...	—	—
7. Forme conosciute da tutta l'Africa del Nord	18	22, 5 %
8. Forme della Cirenaica e dell'Africa nord-orientale	6	7, 5 %
9. Forme dell'Egitto e in genere orientali	20	25,00 %
10. Forme dubbie	6	7, 5 %
TOTALE.....	80	100,00 %

Togliamo da questo prospetto le forme cosmopolite, le etiopiche, quelle diffuse oltre la regione paleartica, le importate, le dubbie e prendiamo in considerazione soltanto quelle de cui si può ricavare qualche conclusione in merito all'affinità con le regioni vicine. Rimane il 7,5 % delle forme diffuse nella Cirenaica e nell'Africa nord-orientale e il 25 % di quelle trovate nell' Egitto e in genere di diffusione orientale. Abbiamo un totale del 32,5 % di fronte al 22,5 % di specie, razze e varietà provenienti da tutta l'Africa del nord. Differenza apparentemente non grande, ma che diventa tale se esaminiamo a fondo quel 22,5 %. Intanto esso comprende alcune specie che sono diffuse non soltanto in tutto il nord Africa, ma anche nell'Asia occidentale.

Tali sono:

Ponera ragusae var. *santschii*, *Messor arenarius*, *Messor rufotestaceus*, *Cardiocondyla nuda* var. *mauritania* (trovata anche a Cipro) (x), *Monomorium subopacum* var. *phoenicia*, *Monomorium subopacum bicolor* var. *subnitida* (conosciuta soltanto dall'Algeria meridionale, Egitto, Transcaspio) (x).

Addentrandoci nell'analisi di questo gruppo osserviamo ancora che le seguenti forme provengono soltanto da zone desertiche, da quella grande zona eremica nel senso di Gridelli (1930, pag. 447):

Messor aegyptiacus (x), *Messor aegyptiacus* var. *foreli* (x), *Monomorium salomonis* var. *obscurata* (x), *Cataglyphis bombycina* (x).

Dal che risulta che gli appellativi « Africa del nord », « Tunisia », ecc. usati comunemente nei cataloghi mirmecologici vanno presi con molte riserve. Le 18 formiche registrate da me nel gruppo di quelle sparse nell'Africa del nord secondo le indicazioni bibliografiche, si riducono percio' almeno a 12 (x) e cioè al 15 % di proprie all'Africa minore costiera ed oriente.

Ma l'esame dell'elenco delle formiche egiziane ci mostra ancora un fatto del più grande interesse: l'assoluta mancanza dell'*Aphaenogaster testaceopilosa* e del *Messor barbarus* che con le loro numerose razze sono sparsi nella zona costiera dell'Africa minore, nella Spagna, Italia e penisola balcanica. Noto a questo proposito che il *Messor barbarus* subsp. *sahlbergi* dell'Egitto appartiene indubbiamente al gruppo del *Messor aegyptiacus*. Tale assoluta mancanza diventa ancor più significativa dato che si tratta di specie che per la loro vistosità e facilità di cattura avrebbero potuto figurare nelle più vecchie collezioni di formiche egiziane.

E' chiaro dunque che l'affinità faunistica tra Egitto e Africa minore è misera, mancandovi una enorme massa di forme che, come quelle citate, costituiscono la caratteristica delle regioni algero-tunisina.

Ho scritto più su che il 32,5 % è costituito da formiche della Cirenaica e in genere orientali. Però ben 11 forme di quelle appartenenti al gruppo

« Africa del nord » sono state trovate in Cirenaica e di queste sei almeno sono diffuse nella regione eremica: il 7,5 %. Arriviamo così al 40 % di forme sparse nella regione eremica.

A titolo indicativo ricordo che le cinque forme etiopiche provengono tutte dall'Africa orientale e cioè dalla Rodesia, dal Sudan e dall'Egitto. Fa eccezione soltanto il *Leptothorax angulatus* trovato anche in Tunisia secondo una vecchia indicazione.

Dall'esame infine delle forme endemiche risulta che quattro di queste sonó razze o varietà di specie esclusivamente orientali.

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Come si vede l'analisi particolareggiata della diffusione delle formiche comprese in questo studio ci ha portato alle seguenti conclusioni:

1. Forme eremiche	No. 32	40, %	67,5 %
2. Forme endemiche	17	21,25 %	
3. Forme etiopico-orientali	5	6,25 %	
4. Forme dell'Africa minore	12	15,00 %	
5. Forme cosmopolite	5	6,25 %	
6. Forme diffuse	2	2,5 %	
7. Forme importate	1	1,25 %	
8. Forme dubbie	6	7,5 %	
	80	100,00 %	

Diremo pertanto che, allo stato attuale delle nostre conoscenze, la fauna mirmecologica egiziana:

1. non ha carattere circum-mediterraneo;
2. è composta prevalentemente di elementi orientali;
3. appartiene indubbiamente alla regione eremica;
4. comprende cinque formiche etiopico-orientali;
5. annovera soltanto scarsi elementi dell'Africa minore costiera.

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A questo punto mi sembra utile confrontare i risultati a cui sono giunto con la diffusione delle formiche dell'Egitto con quelli ai quali sono arrivati il dott. Gridelli per i coleotteri della Cirenaica e C. Menozzi per le formiche della Palestina. Avrei voluto discutere la diffusione delle formiche libiche; ma le nostre conoscence sulle stesse sono ancora troppo superficiali e,

salvo gli elenchi pubblicati in gran parte dall'amico Menozzi, tutti gli altri sono di vecchia data e le rispettive determinazioni hanno subito radicali cambiamenti.

Dividendo i coleotteri della Cirenaica a seconda della loro diffusione il dott. Gridelli (l.c. 1930, pag. 463) traccia il seguente schema:

Specie la cui area di diffusione non è sufficientemente nota ...	No. 64	20,57 %
Specie endemiche (note soltanto dalla Cirenaica s. lato)	12	
Specie libiche	9	75,25 %
Specie etiopiche	10	
Specie eremiche	103	
Specie mauritaniche	13	4,18 %
	311	100,00 %

Applicando questo schema alle formiche risulta che il 67,5 % di quelle egiziane sono diffuse « nella sotto-regione eremica oppure soltanto in una parte maggiore o minore di essa ». Inutile dire che il 67,5 % raggiunto dalle formiche si avvicina assai al 75,25 % dei coleotteri. Per ora dunque, mirmecologicamente, si è giunti per l'Egitto alle conclusioni alle quali è arrivato il dott. Gridelli per i coleotteri della Cirenaica.

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Recentemente il collega Carlo Menozzi ha pubblicato un ottimo lavoro riassuntivo sulle formiche della Palestina (Memorie Soc. Ent. Ital., 1933, pagg. 49-113). Ai fini della distribuzione geografica delle formiche, i risultati ai quali è giunto sono molto interessanti e credo utile un raffronto con quelli delle forme egiziane.

Egli annovera 96 formiche (più un *Stigmatomma* indeterminabile) distribuite tra specie, razze e varietà.

Di queste:

No. 23 e cioè il 23,9 % sono endemiche,
6 e cioè il 6,2 % sono cosmopolite,
25 e cioè il 25,7 % sono diffuse nell'Egitto, Sinai, Palestina, Siria e 3 di esse nella Transgiordania,
25 e cioè il 25,7 % sono diffuse nelle regioni del nord-Africa (secondo il vecchio senso) ed anche nell'oriente,
8 e cioè l' 8,3 % sono circum-mediterranee,

7 e cioè il 7,2 % appartengono al bacino del mediterraneo sud-orientale,

2 e cioè il 2,0 % sono diffuse oltre la regione paleartica ed etiopica.

Lo studio delle 25 forme provenienti dall'Africa del Nord ci mostra però che le seguenti non appartengono all'Africa minore costiera:

Pheidole jordanica, *Pheidole pallidula arenarum* var. *orientalis*, *Crematogaster inermis*, *Monomorium dentiger*, *Tetramorium punicum*, *Tetramorium punicum* var. *lucidula*, *Tapinoma simrothi* var. *phoenicia*, *Plagiolepis pallescens* var. *ancyrensis*, *Acantholepis frauenfeldi* subsp. *dolabellae*, *Camponotus compressus* subsp. *sanctus*, *Camponotus compressus thoracicus* var. *fellah*, *Camponotus aethiops* var. *concava*, *Camponotus gestroi* var. *cretica*, *Paratrechina jaegerskjoeldi*, *Cataglyphis bicolor* var. *nodus*.

Come risulta dallo schema seguente queste 15 formiche sono diffuse in piccola parte nella Cirenaica, in maggior numero nell'Egitto e sopratutto nelle zone orientali:

SPECIE	Algeria settentr.	Tunisia settentr.	Fezzan	Cirenaica	Egitto	Sinai	Palestina	Siria	Asia minore	Grecia	Penisola balcan.	Russia sud-est	Caucaso	Transgiordania	Asia centrale	Turkestan	Cipro	Rodi
1. *Pheidole jordanica (x)*		?		?	+		+											
2. *Pheidole pallidula arenarum orientalis*							+	+	+	+	+		+		+			
3. *Crematogaster inermis (x)* ...					+		+	+										
4. *Monomorium dentiger*							+	+	+	+				+				
5. *Tetramorium punicum (x)* ...				+	+	+	+	+				+						
6. *Tetramorium punicum lucidula*							+	+	+							+		
7. *Tapinoma simrothi phoenicea.*					+	+	+			+							+	+
8. *Plagiolepis pallescens ancyrensis*					+		+		+									
9. *Acantholepis frauenfeldi dolabellae*							+	+	+									
10. *Camponotus compressus sanctus*							+	+	+					+				
11. *Camponotus compressus thoracicus fellah (x)*					+	+	+	+										
12. *Camponotus aethiopis* var. *concava*							+		+	+	+		+	+				
13. *Camponotus gestroi cretica* ...							+		+	+								
14. *Paratrechina jaegerskjoeldi (x)*			+		+	+	+	+										
15. *Cataglyphis bicolor nodus*							+		+		+							

È facile rilevare da questo prospetto che almeno cinque (x) delle formiche registratevi sono da considerarsi come appartenenti alla regione eremico

orientale (s. Gridelli). Altrettanto si deve dire delle 25 diffuse nell'Egitto, Sinai, Palestina, Siria, Transgiordania e della *Cardiocondyla elegans sahlbergi* registrata dal collega Menozzi nel gruppo di quelle provenienti dal bacino mediterraneo sud-orientale. Abbiamo dunque un totale di 31 forme.

Applicando alle formiche palestinesi gli schemi della loro diffusione usati per le egiziane arriviamo a queste interessanti conclusioni:

Forme eremico-orientali	No. 31	32,2 % } 56,1 %
Forme endemiche	23	23,9 % }
Forme diffuse dal bacino orientale del Mediterraneo all'Asia centrale	10	10,4 %
Forme esclusive del Mediterraneo sud-orientale	6	6,2 %
Forme dell'Africa minore costiera	10	10,4 %
Forme circum-mediterranee	8	8,3 %
Forme cosmopolite	6	6,2 %
Forme diffuse oltre le regioni paleartica ed etiopica	2	2,0 %
	96	

Le formiche palestinesi diffuse nella zona eremica raggiungono dunque il 56,1 %; come si vede un percento minore di quello raggiunto dalle egiziane 67,5 %. Ma nella Palestina è maggiore il numero delle orientali (10,4 % rispettivamente 6,2 %) che sostituisce naturalmente il percento mancante. Più basso è pure il % delle forme provenienti dall'Africa minore costiera (10,4 % di fronte al 15 % delle egiziane).

Diremo dunque che la fauna mirmecologica palestinese:

1. non ha carattere circum-mediterraneo;
2. comprende più della metà di forme eremico-orientali;
3. raggiunge il 16,6 % di formiche del Mediterraneo orientale e dell'Asia sud-occidentale paleartica;
4. annovera soltanto il 10,4 % di elementi dell'Africa minore costiera.

Delle 96 formiche della Palestina, 21 sono state rinvenute anche nell'Egitto e di queste:

No. 7 provengono anche dell'Africa minore costiera;
14 sono diffuse dalla Cirenaica all'oriente,

⁂

Ho voluto riportare le conclusioni a cui è giunto il dott. Gridelli con i coleotteri della Cirenaica e C. Menozzi con le formiche palestinesi allo scopo di semplice confronto con quelle dell'Egitto. In questi ultimi anni parecchi Autori hanno studiato la diffusione di vari gruppi d'insetti del Mediterraneo in senso lato portando contributi notevolissimi alla ripartizione della regione in sotto-regioni, ricercando poi le origini e la provenienza delle singole faune.

Il mio lavoro vuol avere uno scopo più modesto e cioè indicare a coloro che riassumeranno i contributi di molti specialisti moderni, quale è la diffusione delle formiche egiziane allo stato attuale delle nostre conoscence.

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Séance du 14 Octobre 1936

Présidence de Monsieur H. C. Efflatoun Bey, *Vice-Président*.

Dons d'ouvrages :

La Société a reçu pour sa Bibliothèque :

1° De Monsieur Guido Paoli, de Gênes : un tiré à part de son travail intitulé : « Descrizione di alcune nuove specie di *Empoasca* (Hemiptera-Homoptera) e osservazioni su specie note ». — Extrait des Memorie della Società Entomologica Italiana, Vol. XV, 1936, pp. 5-24.

2° De Monsieur Francis Hemming, de Londres : son travail intitulé « The Generic names of the Holarctic Butterflies, Vol. I, 1758-1863 » (Un volume édité par le Museum Britannique d'Histoire Naturelle de Londres. 1934.

3° De Monsieur W. J. Hall, de Mazoe (Rhodesie) : un exemplaire de la Publication No. 4a, 1936, éditée par la British South Africa Company, Mazoe Citrus Experimental Station.

4° De Monsieur le Professeur Dr. W. Roszkowski : un tirage à part du travail de Monsieur Tadeusz Jaczewski intitulé : « Contributions to the knowledge of Aquatic Heteroptera of Egypt ». — Extrait des Annales Musei Zoologici Polonici de Varsovie, Tome XI, No. 10, 1936, pp. 171-216.

5° De Monsieur le Docteur A. Cros, de Mascara (Algérie) : 4 tirés à part relatifs à ses travaux sur la biologie des Meloides.

6° De Monsieur R. H. Greaves et Mademoiselle Margaret Greaves, du Caire : un exemplaire de leur récente publication intitulée « Sixty Common Birds of the Nile Delta ».

Le Conseil remercie les généreux donateurs.

Contribution aux Collections d'Entomologie :

Monsieur A. Alfieri fait don d'environ 2000 spécimens d'insectes qu'il a recueillis au cours de ses chasses en Egypte. Cette collection comprend des Névroptères, Hémiptères, Hyménoptères (notamment fourmis) et sa collection complète des Odonates d'Egypte.

Le Conseil remercie.

Nominations :

Sur la proposition de Messieurs le Professeur H. C. Efflatoun Bey et

A. Alfieri, la Bibliothèque du Ministère de l'Instruction Publique au Caire et l'Imperial Chemical Industries (Egypt) S.A., sont admis à faire partie de la Société en qualité de membres titulaires.

Echanges :

Se font inscrire pour l'échange mutuel des Publications :

1° The Linnean Society of New South Wales, Sydney, N.S.W., Australie.

2° Department of Agriculture and Fisheries, Entomology Section, Bangkok, Siam.

3° Le Museo Entomologico « Pietro Rossi » de S.A.S. le Prince Alessandro della Torre e Tasso, Duino, Italie.

4° The Philippine Agriculturist, Library, College of Agriculture, Laguna, Iles Philippines.

5° The American Midland Naturalist, Editorial Office, University of Notre-Dame, Notre-Dame, Indiana, Etats-Unis d'Amérique.

6° Sociedad de Biologia de Montevideo, Montevideo, République de l'Urugay.

Nécrologie :

Le Secrétaire Général a le regret d'annoncer le décès de Monsieur le Grand Officier Professeur Docteur Raffaello Gestro, qui avait été élu Membre Honoraire de la Société en 1935.

Les *Saprinus* sabulicoles du Nord de l'Afrique

(Coleoptera-Histeridae)

(avec 3 Figures)

par P. de Peyerimhoff.

I. — Remarques sur la classification des Saprinus Er. (sensu lato).

1. Le caractère qui exprime peut-être le mieux la classification naturelle des *Saprinus* est la structure du front. Il est connu depuis longtemps. Reichardt rappelle (Beiträge zu einer Monographie der Saprininae, I, in *Mitt. Zool. Mus. Berlin*, 18, 1932, p. 5) que dès 1834 Erichson en avait indiqué l'emploi et distingué les trois séries qui contribuent à former encore aujourd'hui les genres *Saprinus* Er. s.str. (front indistinct de l'épistome), *Hypocaccus* Thoms. (front séparé de l'épistome par une ligne ou une carène transversale et orné de un ou de deux chevrons), *Hypocacculus* Bickd. (front séparé de même, et de sculpture variable, mais sans chevrons).

Ce caractère, il est vrai, n'est pas toujours catégorique. Il y a des *Saprinus* (*S. ruber* Mars. [!], et certains autres du groupe du *semistriatus* Scriba et du groupe du *rasselas* Mars. [Bickhard]) où la ligne frontale existe sous la forme d'un trait extrêmement fin. Chez deux *Hypocacculus* (*tunisius* Mars. et *amoenus* Er.) elle est tantôt présente, tantôt nulle. Mais Reichardt (*l.c.*, p. 17) a montré que tous les *Saprinus* s.str., qu'ils aient ou non une trace de ligne frontale, sont dépourvus de « fossettes préapicales » au prosternum, alors que les *Hypocacculus* sans ligne frontale (ces derniers composant en partie le nouveau genre *Chalcionellus* Reichd.) sont toujours pourvus de ces fossettes. Grâce à cet artifice, l'ambiguité est pratiquement dissipée.

2. D'autres difficultés sont apparues quand on a cherché à définir et à distinguer les *Saprininae* sabulicoles. Chez la plupart des Coléoptères sabulicoles fixés, la structure se modifie profondément et dans les directions les plus variées. Chez les *Saprininae*, c'est ainsi qu'on observe : le développement considérable des dents terminales aux tibias antérieurs et parfois l'atrophie des tarses de cette paire, — l'épaississement des fémurs, surtout des fémurs postérieurs — l'élargissement, souvent en outre l'épaississement des tibias postérieurs, accompagné parfois de la disjonction des lignes d'épines qui ornent la tranche supérieure, la ligne la plus externe se séparant des autres et venant traverser en longueur, vers le milieu, la face latérale du membre, — la transformation des ongles en griffes extraordinairement fines, ou même en soies, — le développement sur la face inférieure d'une pubescence claire parfois très longue et qui ressort en frange sur les côtés du prothorax, — la

transformation de la plaque prosternale en carène avec atrophie des stries internes, — enfin le bombement extraordinaire du corps surtout en dessous.

Tous ces caractères, qui sont des caractères « d'adaptation » typiques, se trouvent réunis chez les *Philothis* Reichd., et de fait ce genre rivalise en singularités avec les Histérides myrmécophiles les plus aberrants. Mais chez les autres *Saprininae* sabulicoles, ils apparaissent tantôt l'un, tantôt l'autre, sans ordre pour ainsi dire, et sans corrélation. En tous cas aucun d'eux n'est dominant et n'est utilisable, par conséquent, à la hiérarchie des genres. C'est pour s'en être servi avec trop de hâte que les premières tentatives de groupement dans ce sens ont pour la plupart échoué.

3. Ainsi Motschoulsky ayant créé, en 1865, le genre *Styphrus* pour un Saprinine à ongles extrêmement ténus (*S. corpulentus* Mots.), Jacobson crut devoir, en 1910, considérer le genre *Xenonychus* Woll. 1864, fondé sur le même caractère, comme identique. Or Reichardt (*Ent. Blätter*, 22, 1926, p. 15) a démontré leur dissemblance fondamentale : *Styphrus* n'a pas de carène frontale (1), les yeux, très grands, débordent largement les côtés de la tête et la carène prosternale est villeuse, — *Xenonychus tridens* J. du V. (*fossor* Woll.) a le front caréné, des yeux réduits, invisibles d'en haut et le prosternum nu. J'ajoute, d'après une constatation personnelle, que *X. tridens* a des fossettes préapicales au prosternum, alors que *S. corpulentus* en est dépourvu.

Depuis, toujours sur le même caractère tiré de la ténuité des ongles (2), on a voulu ranger parmi les *Styphrus* une série de *Saprininae* propres aux dunes sahariennes du Nord de l'Afrique, très remarquables, entre autres, par leur corps extraordinairement bombé (*altus* Lew., *Chobauti* Théry, *bidens* Peyerh.). En réalité ces insectes ne sont ni des *Styphrus*, à cause de leurs yeux réduits, de leurs tibias antérieurs bidentés, à tarses atrophiés et du bombement du corps, — ni des *Xenonychus*, à cause de leur front indistinct de l'épistome, de leur prosternum villeux, muni de fossettes préapicales, et de la constitution de leurs pattes antérieures. Reichardt (*Ann. Mus. Zool. de l'Acad. des Sciences de l'U.R.S.S.*, 1929, p. 295 et 301) les a placés dans son genre *Philothis*, créé pour 4 espèces du Boukhara et de la Transcaspie. En décrivant plus loin une espèce nouvelle (*P. alsiosus* m.), je montrerai que ces *Philothis* africains, s'ils ont une parenté indubitable avec leurs congénères asiatiques, s'en distinguent pourtant collectivement.

Quant au « *Styphrus* » *Peyerimhoffi* Chob. (*Bull. Soc. ent. Fr.* 1921,

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(1) Le seul spécimen de *Styphrus corpulentus* Motsch. que je possède (il est étiqueté « Tr. Casp. Merw. ») a une ligne frontale extrêmement ténue et qu'on n'aperçoit que sous un certain jour.

(2) Ni chez les *Styphrus*, ni chez le *Xenonychus*, les ongles ne sont « sétiformes » comme ils le sont, littéralement, chez les *Philothis*. Reichardt (*Ann. Mus. Zool. Ac. Sc. de l'U.R.S.S.*, 1929, p. 294, note) l'a rappelé. Schmidt (*L'Abeille*, XXVIII, 1895, p. 178) l'avait remarqué déjà pour le *X. tridens* J. du V.

p. 296), de Tougourt (Sahara algérien), dont je viens, grâce à la complaisance de M. Ch. Fagniez, d'examiner à nouveau le type unique, il ne semble pas davantage pouvoir être maintenu dans le genre. Il a bien le front dépourvu de carène, les côtés du prothorax longuement ciliés et les ongles sétiformes. Mais le corps est aplati (comme chez les *Pholioxenus* Reichd. : *rutilus* Er., *Quedenfeldti* Schm.) et la marge latérale du pronotum est partout visible, la tête est finement et densément rugueuse, le front est prolongé de chaque côté au niveau des yeux qui de dessus sont à peu près indistincts, la lame prosternale est longue, aplatie et nue, et les fossettes préapicales sont très marquées. Ce dernier caractère, nonobstant la pilosité du dessous et la transformation des ongles, engage à classer l'insecte parmi les *Hypocacculus* Bickh. sensu lato, où plusieurs espèces sont précisément dépourvues de ligne ou carène frontale.

Ces trois exemples montrent combien le caractère tiré de la structure des ongles a pu être décevant.

4. Déceptions analogues quand on a voulu prendre comme caractère dominant l'épaississement des pattes postérieures.

Erichson, dès 1834, avait établi le genre *Pachylopus* sur un insecte du Cap, très singulier à tous points de vue, notamment par le prolongement en arrière, chez la femelle, des élytres et du premier sternite abdominal qui arrive à dépasser le pygidium, ainsi que par le renflement marqué des pattes postérieures. Certains *Saprinus* d'Amérique, du Japon, de Nouvelle-Zélande, etc. présentant aussi ce renflement, on pensa en faire de même des *Pachylopus*. Schmidt (*Bull. Soc. ent. Fr.* 1896, p. 206) consacra cette méthode en décrivant son *Pachylopus Henoni*, du Sahara algérien. Et pourtant, il ne semblait pas absolument convaincu de l'homogénéité du genre ainsi composé d'espèces qui « toutes, quoique bien différentes les unes des autres, ont un faciès commun qui les fait reconnaître au premier abord », puisqu'il concluait : « à moins qu'on ne veuille réduire le genre *Pachylopus* à l'espèce originale et peut-être aux *P. sulcifrons* et *pedator*, il faudra y rattacher le *Saprinus dimidiatipennis* Lec., le *S. sabulosus* Fairm. et même le *S. grossipes* Mars. ».

En réalité, tous ces *Saprinus* à pattes élargies sont un agrégat d'éléments composites où Reichardt, une fois de plus (*Entom. Blätter* 22, 1926, p. 12-18) a tenté de mettre un peu d'ordre. Le tableau qu'il consacre aux *Saprininae* munis d'une ligne frontale partage ces insectes en deux groupes caractérisés l'un par le pronotum lisse ou ponctué seulement tout près de la base, l'autre par le pronotum copieusement ponctué sur une grande partie du disque. Le premier, très bien justifié, comprend les genres *Pachylopus* Er. (réduit, comme le prévoyait Schmidt, au *P. dispar* Er.), *Neopachylopus* Reichd. (réservé aux « *Pachylopus* » d'Amérique et d'Asie orientale), *Ammostyphrus* Reichd. (une espèce du Turkestan) et *Baeckmanniolus* Reichd.

(pour les *Hypocaccus* ou *Pachylopus dimidiatus* Ill., *maritimus* Steph., *Schmidti* Théry, et d'autres analogues de l'Amérique du Nord). A mon avis cependant, les *Baeckmanniolus* ne semblent guère distincts des *Neopachylopus* (voir le tableau des *Saprininae* qui termine ce mémoire).

Le deuxième groupe comprend deux divisions : l'une pour les formes à pubescence inférieure nulle ou réduite ; ce sont les *Hypocaccus* Thoms. allégés des espèces à pronotum lisse, et les *Hypocacculus* Bickh., — l'autre pour les formes pubescentes à la fois sur les épipleures du prothorax et les côtés des sternums ; elle contient le genre *Xenonychus* Woll. et le genre nouveau *Exaesiopus* Reichd. Ces divisions, il faut le reconnaître, ne sont pas heureuses. Chez les *Saprininae*, la pubescence inférieure est non seulement un caractère adaptatif, par conséquent peu utile à priori, mais un caractère variable et progressif : il y a toutes les transitions entre la pilosité imperceptible des *Hypocacculus praecox* Er., *biskrensis* Mars., *Vethi* Bickh., etc., celle beaucoup plus développée de l'*H. Tigris* Mars., celle très nette des *Exaesiopus* et la longue villostié du *Xenonychus tridens* J. du V. Dans son tableau des *Hypoccaccalus* (p. 60 et 63, Reichardt cite lui-même deux espèces (*pubiventris* Reichd. et *hosseinius* Théry) où non-seulement les côtés des sternums, mais les épipleures du prothorax sont pubescents et qui, logiquement, devraient prendre place parmi les *Exaesiopus*.

5. Rien ne démontre mieux la faible valeur de ce caractère tiré de la pubescence, que la composition très défectueuse du genre *Exaesiopus* Reichd., tel du moins qu'il est actuellement conçu. Ce genre a pour type le *Saprinus grossipes* Mars., c'est-à-dire une espèce à front chevronné et qui ne se distingue guère des autres *Hypocaccus* que par le renflement des pattes postérieures et le développement de la pubescence du dessous. L'auteur y range en outre le « *Pachylopus* » *Henoni* Schm., du Sahara algérien et une espèce nouvelle, *atrovirens* Reichd., de Transcaucasie et de Transcaspie, très voisine de *grossipes*. Cette série est certainement bien homogène et je n'y vois d'ailleurs qu'un petit sous-genre des *Hypocaccus* Thoms.

Mais Reichardt y ajoute le *Saprinus Syphax* Reitt., d'Algérie (avec le *S. duriculus* Reitt., de Transcaucasie), où la structure de la tête est tout différente : le front est pointillé, sans trace de chevrons, la ligne frontale est très fine, nullement carénée, l'épistome est plan, sans aucune tuméfaction au sommet. De plus, le prosternum est dépourvu de fossettes préapicales, alors qu'elles sont, comme chez les *Hypocaccus* s.str., très nettes dans l'*E. grossipes* et l'*E. Henoni*. Enfin, les tibias postérieurs ne sont ni élargis ni épaissis et leur ligne externe de spinules n'est pas déjetée vers le milieu de la face latérale du membre. Pour moi, le *Saprinus Syphax* n'est guère qu'un *Hypocacculus* un peu aberrant (3).

(3) En revanche, il ne faut pas méconnaître le facies particulier de cet insec-

Il en est de même, à mon avis, de l'*Exaesiopus Grosclaudei* Norm. (*Bull. Soc. Hist. nat. Afrique du Nord*, 26, 1935, p. 110), à pubescence et ciliation un peu développées, mais à pattes postérieures non épaissies. C'est un *Hypocacculus* qui peut se placer auprès du *hosseinius* Théry. D'ailleurs il est muni de fossettes préapicales au prosternum.

Enfin M. An. Alfieri m'a confié la description d'un *Saprinus* égyptien très remarquable (*Sphingis* m.) qui, si on utilise le tableau de Reichardt (*l.c.*, 1926), devrait se ranger aussi parmi les *Exaesiopus*. Mais il diffère du *grossipes* et de l'*Henoni* par son front sans chevrons, à ligne transversale très fine, peu marquée au milieu, l'épistome plan, le prosternum dépourvu de fossettes préapicales. Il diffère du *Syphax* par le prosternum prolongé en haute carène sans stries internes distinctes, les tibias antérieurs à 3 énormes dents aigues non précédées de denticules, les pattes postérieures (et même les intermédiaires) très épaisses, leurs tibias eux-mêmes dilatés, enfin la ponctuation forte et dense. Bref, il n'a d'affinités ni avec les uns ni avec les autres et dois être considéré, pour le moment, comme un *Saprinus* s. lato aberrant.

Le genre *Exaesiopus*, en fin de compte, est un composé d'éléments disparates et ne saurait rester tel qu'il est actuellement établi.

6. En résumé :

a). Aucun des caractères relevés chez les *Saprininae* sabulicoles n'est intégral ou catégorique dans l'ensemble. Tous, au contraire, se montrent progressifs. L'ongle très fin des *Styphrus* et du *Xenonychus* fait passage de l'ongle normal en griffe des *Saprinus* s. str. à l'ongle sétiforme des *Philothis*. Le fémur postérieur à peine épaissi du *Saprinus Syphax* passe par tous les intermédiaires (*Styphrus corpulentus*, *Xenonychus tridens*, *Baeckmanniolus dimidiatus*, *Hypocaccus crassipes*, *Exaesiopus grossipes*) aux fémurs énormes d'*Exaesiopus Henoni*, de *Baeckmanniolus Schmidti* et des *Philothis*. Mêmes gradations dans l'épaississement du tibia postérieur et, comme on le verra plus loin, dans la disjonction de la ligne externe de ses spinules dorsales. Il y a tous les passages entre la pubescence inférieure mal développée telle qu'on l'observe chez nombre d'*Hypocacculus*, la pilosité complète d'*E. Syphax* et la longue villosité des *Styphrus*, *Xenonychus* et *Philothis*. De même pour la structure du prosternum entre les hanches qui va d'une large plaque nue munie de stries complètes et distantes à une carène aiguë, villeuse, où les stries disparaissent.

b). Aucun de ces caractères n'est commun à *tous* les *Saprininae* sabulicoles. Tantôt l'un, tantôt l'autre apparaît, et s'ils se combinent, c'est sans direction et comme au hasard. Les *Pachylopus*, *Neopachylopus*, et certains

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te, et surtout son mode d'existence, dans les tiges altérées des Orobanchacées désertiques, où il poursuit les larves de Diptères phytophages ou saprophages.

Hypocaccus n'ont que l'épaississement des fémurs (et parfois des tibias) postérieurs. Les « *Exaesiopus* » *Syphax* et *Grosclaudei* n'ont que la pubescence inférieure. Les *Baeckmanniolus dimidiatus* et *Schmidti* ont à la fois les fémurs épaissis et le dessous plus ou moins pubescent. Le « *Styphrus* » *Peyerimhoffi* a le prothorax cilié et les ongles sétiformes, mais il est aplati et la lame prosternale est nue et striée. Les *Styphrus* vrais ont la pubescence, le prosternum caréné et villeux et les ongles très atténués. Le *Xenonychus tridens* a les mêmes caractères avec, en plus, l'élargissement de la patte postérieure, la transformation du tibia antérieur en pelle à trois dents et le corps bombé, et en moins la villosité de la carène prosternale. Seuls les *Philothis* réunissent la collection complète de ces caractères adaptatifs, y compris les ongles littéralement sétiformes et souvent même l'atrophie totale du tarse antérieur.

c). Aucun de ces caractères, par conséquent, si précieux qu'ils soient pour la distinction des espèces, n'est valable pour leur groupement hiérarchique, parce qu'aucun n'est dominant. Leur apparition d'abord limitée, progresse irrégulièrement, à la cadence de la déformation provoquée par la vie sabulicole, et aussi dans les directions très diverses où cette déformation affecte les *Saprininae*. Ce sont, comme on l'a dit, des caractères « adaptatifs », propres non pas à une lignée, mais à de petites séries détachées ça et là de la masse des espèces dites normales.

Au point de vue taxonomique, il faut renoncer à ces caractères adaptatifs dans la hiérarchie des groupes et revenir aux caractères que l'expérience a désignés comme exprimant au mieux les rapports naturels, savoir la structure de la tête et la sculpture du pronotum.

Au point de vue de la nomenclature, et dès l'instant qu'il est démontré que les *Saprininae* sabulicoles, loin d'être une lignée homogène, sont composés de petites séries détachées de la masse dite normale, on peut hésiter entre deux méthodes : ou les incorporer purement et simplement aux *Saprininae* normaux à titre d' « espèces aberrantes », — ou les séparer en autant de genres ou de sous-genres que leurs caractères d'adaptation semblent le justifier. La première méthode était celle des anciens taxonomistes, de Marseul en particulier, qui se montrait très économe de nomenclature. La seconde semble prévaloir aujourd'hui, où l'on multiplie volontiers les sections et les groupes.

Telles sont les constatations et les réflexions suggérées par les recherches préliminaires aux deux descriptions qui vont suivre.

II. — Description de deux espèces nouvelles de Saprininae sabulicoles.

M. An. Alfieri m'a communiqué une série de *Saprininae* égyptiens comprenant, entre autres, deux sabulicoles très remarquables, *Philothis altus* Lew. (noté du Djebel Asfar), qui n'avait pas été revu depuis sa description,

et une espèce inédite (*Sphingis* m.), dont la position systématique est délicate. Au cours de leur examen, j'ai constaté, dans mes récoltes du Sahara algérien, une autre espèce inédite dont voici la diagnose :

Philothis *(sensu lato)* **alsiosus, n.sp.** — Long. 2,5-3,5 mm. — P. bidenti Peyerh. *statura, structura, facie peraffinis, pronoto autem antice medioque levigato, tantum ad latera et prope basin (grossius) punctato, coleopterorum stria basali cito extra scutellum evanida, punctis valde minoribus, sejunctis, usque ad striam suturalem ductis, stria dorsali secunda evanida, tibiis posticis minus dilatatis eorumque tarsis longioribus, distinguendus.* — Ad eremos Saharae.

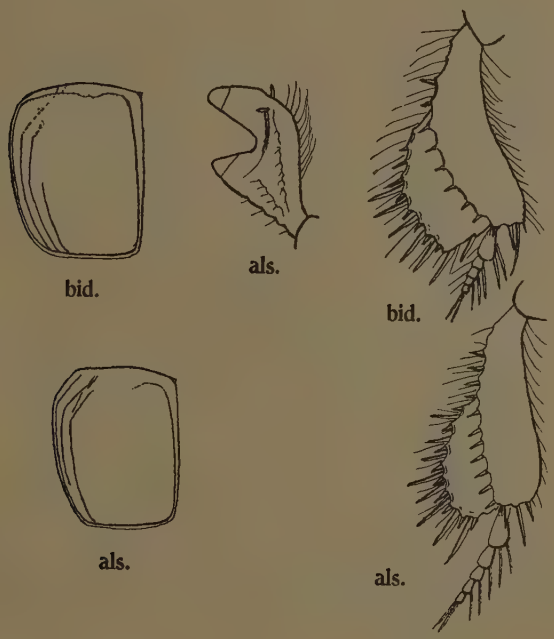

Fig. 1. — *Philothis bidens* Peyerh. et *Philothis alsiosus* nov. spec.: élytre gauche (la ponctuation n'est pas indiquée), — tibia antérieur gauche, vu en dessous (dessiné sur *Philothis alsiosus;* le membre de *Philothis bidens* est à peu près conformé de même), — face externe du tibia postérieur droit.

Diagnose établie sur trois spécimens identiques recueillis dans le sable des dunes, l'un à Djamaa près Tougourt, les deux autres à Fort-Lallemand au sud d'Ouargla. C'est à tort qu'ils sont mentionnés, dans le volume consacré aux Coléoptères de l'expédition scientifique du Hoggar (*Mém. Soc. Hist.*

nat. Afrique du Nord, II, 1931, p. 40) sous le nom de *Philothis* « *bidens* Peyerh. ».

Les *Philothis* africains, y compris celui-ci, sont actuellement au nombre de 4, distribués en deux séries où certains caractères s'opposent nettement (4). Dans la première (*bidens* + *alsiosus*, fig. 1), les tibias antérieurs, très larges, ont deux énormes dents dont la proximale part du milieu du membre, les tarses antérieurs, quoique très atrophiés, existent encore, les tibias postérieurs sont traversés, au milieu de leur face externe, d'une ligne de spinules disjointe

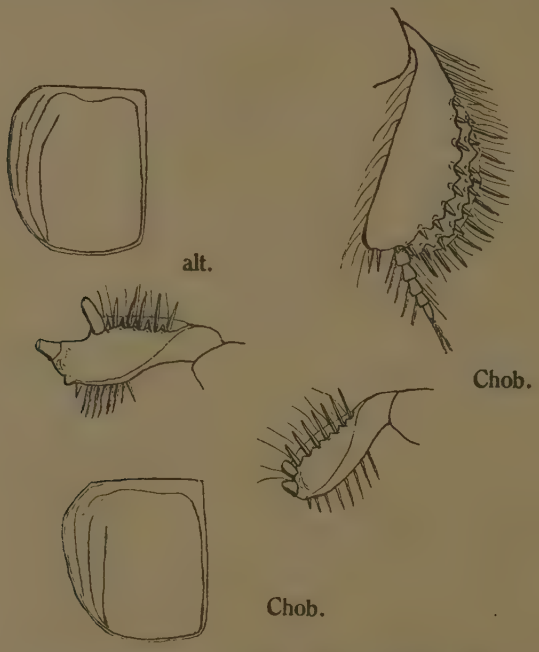

Fig. 2. — *Philothis altus* Lew. et *Philothis Chobauti* Théry : élytre gauche (la ponctuation n'est pas indiquée), — tibia antérieur gauche, vu en dessous, — face externe du tibia postérieur gauche (dessiné sur *Philothis Chobauti;* le membre de *Philothis altus* est à peu près conformé de même).

de la tranche supérieure, et la ponctuation est presque simple. C'est à peu près, sauf les calus et le luisant du corps, la structure des *Philothis* asiatiques. — Dans la seconde (*altus* + *Chobauti*, fig. 2), les tibias antérieurs, à peine élargis, ont deux dents réduites et rejetées vers l'extrémité du membre, les tarses antérieurs ont totalement disparu, les tibias postérieurs ont leurs lignes de spinules entassées sans disjonction sur la tranche supérieure, et la

(4) Voir au surplus le tableau qui termine ce mémoire.

ponctuation est vermiculée ou plutôt chevronnée. Dans l'une et l'autre, les espèces composantes sont évidemment très voisines.

Le genre *Philothis* Reichd., de création heureuse et justifiée, renferme les *Saprininae* les plus modifiés par la vie sabulicole. Comme on l'a noté plus haut, la collection complète des caractères adaptatifs s'y trouve réunie. Mais il n'est pas rigoureusement homogène. Déjà l'auteur en a détaché un sous-genre *Farabius* caractérisé par le prosternum dilaté entre les hanches antérieures et pourvu en ce point d'une paire de stries internes disparaissant sur la partie antérieure transformée en haute carène. Les *Philothis* du Sahara africain me semblent tout aussi distincts par leur pronotum toujours sculpté (au lieu d'être lisse ou à sculpture obsolète) et l'absence de calus tant au pronotum qu'aux élytres. La séparation géographique vient à l'appui de ces caractères distinctifs.

Saprinus *(subgenus novum verisim.)* **Sphingis. n.sp.** — Long. 3,8 mm. — *Corpus ovatum, modice pulvinatum, supra ex toto punctis grossis (postice minoribus) insculptum. Caput dense, antice subrugose punctatum, fronte transversaliter carinata, oculis desuper plane visabundis, antennis sat proceris, funiculo 7-articulato, clava brevissime fusiformi, fere tota tomentosa. Pronotum duplo latius quam longius, a basi usque ad summum attenuatum,*

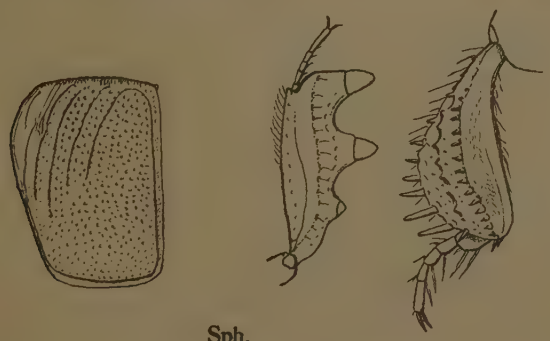

Fig. 3. — *Saprinus Sphingis* nov. spec.: élytre gauche, tibia antérieur droit, tibia postérieur droit.

angulis anticis bene indicatis, ad apicem ut ad latera valide marginatum, punctis grossis (spatiolo medio minoribus) versus ad latera sensim confertis ibique cum costulis undulatis in longitudinem vermiculatis instructum, utrinque infra setis flavis parce fimbriatum. Scutellum punctiforme. Coleoptera pronoto latiora et ferme duplo longiora, postice paullo angustata, valide sat parce, versus ad apicem sensim modicius, callo humerali excepto, punctata, striis senis insculpta, videlicet: subhumerali externa brevissima, subhumerali interna post callo interrupta, deinde usque ad medium oblique ducta, prima,

secunda, tertia circa medium progressis, quarta breviore, cum suturali (hac ad suturam ipsam postice non approximante) arcuatim conjuncta; sulcus apicalis ut stria marginalis plane indicati. Pygidia punctis superficialibus transversis subocellatis conferta. Lamina prosterni angusta, praealta, foveis praeapicalibus nullis, striis internis approximatis, paullo ante summum conjunctis. Sterna et abdominis latera pilis subappressis modice vestita. Pedes robusti, tibiis anticis valide tridentatis, tarsis integris, femoribus posticis inflatis, tibiis subtriangularibus, nullomodo applanatis, extrorsum contrario dilatatis, extus linea spinarum medio divisis.

Hab. : Aegyptum.

Basse-Egypte : Sakkara, 12.1.1933, un spécimen ♀ dans la collection de M. An. Alfieri.

Le tableau où Reichardt (*Ent. Bl.* 22, 1926, p. 14) a défini le genre *Exacsiopus* conduit à y placer cette espèce. Mais on vient de montrer que les *Exaesiopus*, tels que les conçoit l'auteur, sont hétérogènes et qu'il convient de les limiter au groupe restreint du *Saprinus grossipes* Mars., où la tête est ornée de chevrons en arrière de la carène frontale et où le prosternum est muni de fossettes préapicales. Ces deux caractères manquent à l'espèce décrite ici, tout comme à l'« *Exaesiopus* » *Syphax* Reitt. D'autre part, *Sphingis* diffère de *Syphax* par une sculpture tout autre, par la lame prosternale très haute et très étroite, par l'épaississement considérable des pattes postérieures, en particulier du tibia, et la disjonction de la ligne de spinules qui vient traverser le membre vers le milieu de sa face interne. Trois alternatives se présentent : créer pour chacune de ces deux espèces un sous-genre distinct, — ou les ranger dans un seul sous-genre, — ou les rattacher simplement, à titre d' « aberrants » aux *Hypocacculus* Bickh. Je préfère laisser irrésolue, pour le moment, cette question de nomenclature.

III. — Distribution taxonomique (très provisoire) des Saprininae.
(*Gnathoncus* J. du Val et *Saprinodes* Lew. exclus)

La tableau qui suit est destiné à présenter sous une forme plus concrète et mieux ordonnée les constatations et remarques développées dans les deux chapitres précédents. Il n'est détaillé que pour les *Saprininae* sabulicoles du Nord-Africain, objet essentiel de ce travail.

L'hypothèse d'une « lignée naturelle » de *Saprininae* sabulicoles est contredite par tous les faits qui montrent, au contraire, l'origine variée, la pluralité des lignées chez ces insectes. On a donc cherché à les classer d'après les caractères dont la valeur systématique avait été éprouvée déjà chez les *Saprininae* normaux, à savoir la structure de la face et la sculpture du pronotum. Les caractères dits « adaptatifs » n'ont été utilisés que secondairement.

La variété de structure des sabulicoles et la diversité de leurs origines

phylogéniques mènent à y multiplier les catégories taxonomiques et mèneront peut-être à y augmenter la nomenclature. Reichardt l'a déjà constaté : « Die Unterfamilie *Saprininae* wird dann schliesslich nur eine grosse und artenreiche Gattung (*Saprinus*) erhalten, um welche sich eine Reihe kleiner, zum grossen Teil monotyper Gattungen gruppiert.» (*Ent. Blätter*, 22, 1926, p. 16. — Voir encore Beiträge zu einer Monographie der Saprininae, I, 1932, p. 5).

Si, pour ma part, je n'ai pas cru devoir donner des noms aux catégories taxonomiques nouvellement distinguées c'est un peu, je le reconnais, par répugnance personnelle, mais c'est aussi pour ménager l'incertitude de l'avenir. Il se peut que tel type, actuellement très isolé, vienne se rattacher par un intermédiaire aujourd'hui inconnu à tel autre dont les rapports avec lui n'étaient pas apparents. Que ce rattachement s'oriente vers un genre ou sous-genre déjà détaché à juste raison des *Saprinus*, ou vers la masse des *Saprinus* normaux, la prudence est recommandable dans les deux cas. De plus, avant de hasarder ici des genres ou des sous-genres nouveaux, il faudrait connaître exactement les sabulicoles orientaux, bien qu'ils paraissent, jusqu'ici, assez distincts des sahariens. Au reste, l'important n'est pas de prodiguer les dénominations, il s'agit surtout de préciser les relations et les différences, fondements de la classification.

Ce mémoire n'est qu'une simple étape et c'est pourquoi le tableau qui le termine est qualifié de « très provisoire ». Si imparfait qu'il soit, je dois dire qu'il profite des précieuses études de M. A. Reinhardt, auxquelles je désire rendre ici le témoignage qu'elles méritent.

1. Front indistinct de l'épistome ou séparé de celui-ci par une ligne transversale très fine. Jamais de fossettes préapicales au prosternum 2

— Front séparé de l'épistome par une carène ou une ligne transversale nette. Quand cette ligne manque (*Hypocacculus* Bickh. ex parte), le prosternum est toujours muni de deux fossettes préapicales 8

2. Lame prosternale horizontale, nue et pourvue de ses deux stries. Tête presque toujours sculptée. Pattes non ou très peu épaissies. Ongles normalement développés. Insectes peu convexes ..... **Saprinus Er.** ***s.str.***

— Lame prosternale transformée en carène aiguë ornée latéralement d'une épaisse toison. Tête lisse. Pattes raccourcies, épaissies et le plus souvent très modifiées. Ongles sétiformes. Dessous pubescent 3

3. Tibias antérieurs multidentés à tarses à peine raccourcis. Ongles très fins, mais non sétiformes. Pattes postérieures presque normales. Yeux grands, très visibles d'en haut. Corps un peu bombé (*S. corpulentus* Motsch). .. .. **Styphrus Motsch.** ***s.str.***

— Tibias antérieurs bidentés à tarses atrophiés ou même absents. Ongles littéralement sétiformes. Pattes postérieures épaissies, leurs tibias fortement dilatés-aplatis. Yeux à peine visibles ou invisibles d'en haut. Corps extraordinairement bombé ..... **Philothis Reichd.** *s. lato* 4

4. Pronotum à ponctuation nulle ou obsolète et bicalleux devant sa base. Base des élytres parfois aussi bicalleuse. Tarses antérieurs atrophiés, mais encore visibles. Face externe des tibias postérieurs divisée au milieu par une ligne de spinules. Tarses postérieurs très courts à articles transversaux. Insectes d'un brun chatain parfois métallique (4 espèces de Transcaspienne et du Boukhara) ..... **Philothis Reichd.** ***s.str.***
(+ s.g. *Farabius* Reichd.)

— Pronotum à ponctuation développée même sur le disque, dépourvu de calus comme les élytres. Tarses postérieurs moins courts, à articles au moins aussi longs que larges. Insectes d'un brun très foncé (4 espèces du Sahara africain collectivement distinctes des précédentes) 5

5. Sculpture composée de points triangulaires presque toujours isolés. Tibias antérieurs très larges et munis de deux énormes dents dont la première est insérée au milieu de la tranche externe ; leurs tarses très atrophiés. Tibias postérieurs traversés sur leur face externe par une ligne d'épines disjointe de l'arête dorsale (Fig. 1) 6

— Sculpture transversalement chevronnée ou vermiculée. 2^{mc} strie dorsale présente, strie basale s'unissant ou tendant à s'unir à la 3^{me} dorsale. Tibias antérieurs étroits et munis de deux dents obtuses rejetées vers l'extrémité ; leurs tarses complètement absents. Tibias postérieurs à épines toutes entassées sur l'arête dorsale (Fig. 2) 7

6. Ponctuation du pronotum distribuée sur toute la surface, sauf le bord antérieur et les bords latéraux, celle des élytres forte, ça et là contiguë, absente en avant de part et d'autre de la suture. Strie basale des élytres entière et reliant la suturale à la marginale ; 2^{me} dorsale présente en arrière. Tibias postérieurs plus larges, à tarses plus courts .....
..... **P. bidens Peyerh.**

— Ponctuation du pronotum effacée sur le milieu du disque, celle des élytres médiocre, isolée, couvrant toute la surface sauf l'extrême base, le calus huméral et les côtés. Strie basale des élytres déficiente peu après la région scutellaire ; 2^{me} dorsale absente. Tibias postérieurs moins larges, à tarses plus allongés ..... **P. alsiosus Peyerh.**

7. Ponctuation du pronotum (effacée tout en avant) entièrement vermiculée, celle des élytres clairsemée, irrégulièrement vermiculée. Tibias antérieurs

un peu plus larges, les deux grandes dents assez distantes .....
..... **P. altus Lew.**

— Ponctuation du pronotum (largement effacée en avant) irrégulière et ça et là vermiculée sur un peu plus de la moitié basale, celle des élytres extrêmement dense, en lignes de chevrons transversales. Tibias antérieurs étroits, les deux grandes dents moins développées et subcontiguës.
..... **P. Chobauti Théry.**

8. Pronotum entièrement lisse, ou ponctué près de la base tout au plus .. 9

— Pronotum ponctué sur la totalité ou la majeure partie de sa surface .. 13

9. Dessus entièrement imponctué et sans stries dorsales. Pas de stries prosternales externes. Elytres et premier sternite abdominal prolongés en arrière chez la ♀ et dépassant le pygidium (*P. dispar* Er., du Cap) ....
..... **Pachylopus Er.**

— Des stries dorsales et des stries prosternales externes. Elytres et premier sternite normaux 10

10. Une strie latérale complémentaire au pronotum. Stries prosternales internes nulles (*A. Cerberus* Reichd., de Syr-Daria) .. **Ammostyphrus Reichd.**

— Pas de strie complémentaire au pronotum. Stries prosternales internes gravées au moins à la base 11

11. Stries prosternales internes jointes dès l'espace intercoxal et transformées ensuite en carène. Base du pronotum rebordée de chaque côté (Amérique du Nord, Sibérie et Japon ; Afrique orientale).... **Neopachylopus Reichd.**
(+ s.g. *Eopachylopus* Reichd.)

— Stries prosternales internes séparées ou, lorsqu'elles sont jointes, ne formant pas carène (5). Base du pronotum sans rebord (holarctiques (6)) ..
..... **Baeckmanniolus Reichd.** (7) 12

12. Pronotum grand, médiocrement rétréci en avant. Tibias antérieurs à 6 dents, les 3 basilaires très petites. Quatre stries dorsales dépassant le milieu de l'élytre dont la ponctuation est largement effacée avant la base

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(5) Sauf chez *B. Schmidti* Théry. Je ferai remarquer en outre qu'il y a une amorce de rebord basal au pronotum chez les *B. maritimus* Steph. et *Schmidti* Théry; cette amorce manque chez le *dimidiatus* Ill. — On a déjà indiqué ci-dessus (I, § 4) combien précaire est la distinction des *Baeckmanniolus* et des *Neopachylopus*.

(6) Chez les espèces paléarctiques, le front est orné d'un chevron en arrière de la carène transversale, et les flancs du métasternum sont pubescents.

(7) Reichardt range dans cette section le *Saprinus Paivae* Woll., des îles du Cap-Vert.

et avant les côtés. Pattes postérieures longues, médiocrément renflées. Des fossettes préapicales au prosternum, dont les stries internes ne se joignent par en arrière. Pubescence des flancs du métasternum courte .. .. **B. dimidiatus Ill., B. maritimus Steph.**

— Pronotum médiocre, notablement rétréci en avant. Tibias antérieurs à 4 dents, la 1re basilaire minuscule, la seconde petite, les deux apicales très grandes. Trois stries dorsales effacées avant le milieu de l'élytre, qui est entièrement ponctué sauf par côtés. Pattes postérieures courtes et très renflées. Pas de fossettes préapicales au prosternum dont les stries internes, jointes dès après l'intervalle coxal, sont transformées ensuite en carène. Pubescence des flancs du métasternum longue et hérissée .. .. **B. Schmidti Théry.**

13. Front orné de 1 à 2 chevrons en arrière de la carène ou ligne transversale. Epistome plus ou moins relevé en bourrelet à l'extrémité 14

— Front lisse, ponctué ou rugueux, mais sans chevron. Epistome plan .. 17

14. Seuls les flancs du métasternum pubescents, et à pubescence généralement faible. Prosternum muni de fossettes préapicales, ses stries internes bien gravées, assez distantes. Tibias antérieurs pourvus de 5 à 6 dents développées. Pattes postérieures médiocrément épaissies .... **Hypocaccus Thoms.** 15

— Epipleures du pronotum assez longuement pubescentes, outre les flancs du métasternum. Tibias antérieurs pourvus de 3 ou 4 dents. Pattes postérieures très épaissies. Corps bombé .... **Exaesiopus Reichd. *s.str.*** 16

15. Pattes postérieures très médiocrement épaissies, la ligne de spinules inférieure des tibias à peine détachée de l'arête dorsale. Flancs du métasternum à pubescence courte .... **H. apricarius Er., Fochi Auz., rugifrons Payk., Schulzei Schm.**

— Pattes postérieures assez notablement épaissies, la ligne de spinules inférieure des tibias nettement détachée de l'arête dorsale .... **H. crassipes Ill.** ( )

16. Tibias antérieurs pourvus de 3 à 4 dents assez obtuses croissant de la base au sommet. Ponctuation des élytres assez dense. Tibias postérieurs à ligne de spinules inférieure un peu détachée de l'arête dorsale. Fossettes préapicales présentes au prosternum, dont les stries internes bien gravées,

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(8) Et aussi, probablement, *Saprinus erosus* Woll., des Canaries (cf. Schmidt, *l'Abeille* XXVIII, p. 178).

rapprochées, cessent peu avant le sommet ..... **E. grossipes Mars.**
(+ 2 espèces orientales)

Ponctuation des élytres limitée à la moitié postérieure, entre la strie suturale et la 3me dorsale ..... *grossipes* s.str.

Ponctuation des élytres étendue sur la majeure partie du disque, presque jusqu'à la base et latéralement jusqu'à la 2me dorsale .....
..... *grossipes* **berberus m.** (9)

— Tibias antérieurs pourvus de 2 énormes dents précédées d'une autre très petite. Ponctuation des élytres très disséminée, composée de gros et de petits points, étendue sur l'espace compris entre la strie suturale et la 3me dorsale. Face externe des tibias postérieurs traversée en dessous du milieu par une ligne de spinules disjointe de l'arête dorsale. Prosternum dépourvu de fossettes préapicales, ses stries internes gravées sur l'espace intercoxal, puis perdues dans une carène obtuse .. **E. Henoni Schm.** (10)

17. Front lisse et labre échancré. Ongles en griffes extrêmement ténues. Tibias antérieurs à 3 énormes dents précédées d'un peigne de 4 à 6 denticules. Côtés du prothorax, des sternums et de l'abdomen longuement villeux. Prosternum muni de fossettes préapicales et transformé en carène courbe où les stries internes sont indistinctes (*X. tridens* J. du V.) ....
..... **Xenonychus Woll.**

— Front ponctué ou rugueux. Labre tronqué 18

18. Tibias antérieurs armés de 5 à 16 denticules croissant généralement de la base vers l'extrémité. Pronotum aussi large à la base que la base des élytres, ses angles postérieurs marqués. Prosternum presque toujours pourvu de fossettes préapicales 19

— Tibias antérieurs armés de 3 larges dents précédées ou non de petits denticules. Pronotum un peu moins large à la base que la base des élytres, ses angles postérieurs complètement arrondis. Prosternum dépourvu de

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(9) *Exaesiopus grossipes* **berberus**, subsp. nov. — *Proles barbara, a typica europaea coleopteris magna ex parte punctatis distincta.* — Je trouve aussi bien à l'intérieur, dans les régions sablonneuses, que sur le littoral maritime : Bône (Théry !), oued Sebaou près Tizi-Ouzou !, Bou-Ktoub dans le Sud-Oranais !, Biskra (Bleuse !), Laghouat (Hénon !). — Bedel, dans ses notes, cite encore le « *grossipes* », — et il s'agit certainement de cette race *berberus*, — de Bou-Saada et de Tunis.

(10) Les passages sont réellement très ménagés entre les *Hypocaccus* du groupe de l'*apricarius* et, successivement, l'*H. crassipes*, l'*Exaesiopus grossipes* et l'*E. Henoni*. De là la suggestion exprimée ci-dessus (I, § 5) de rattacher les *Exaesiopus* s. str. aux *Hypocaccus*.

fossettes préapicales. Côtés du prothorax, des sternums et du ventre pileux 20

19. Ongles normaux. Angles antérieurs du pronotum arrondis. Pilosité inférieure nulle ou peu développée ..... **Hypocacculus Bickh.** *s. lato* (11)

— Ongles transformés en un long appendice bifide. Angles antérieurs du pronotum très marqués. Pilosité du dessous, surtout celle du prothorax, très longue. Pattes nullement épaissies (? sous-genre des *Hypocacculus*. ..... **« Styphrus » Peyerimhoffi Chob.**

20. Tête à carène frontale nette et à ponctuation fine. Yeux saillants par côtés. Pronotum trapézoidal à angles antérieurs arrondis, sa ponctuation très fine, peu perceptible au milieu du disque. Pattes minces, tibias antérieurs à 3 larges dents précédées de quelques denticules très petits, tibias postérieurs non élargis. Stries du prosternum entières, les internes bien séparées (? sous-genre des *Hypocacculus*)... **« Exaesiopus » Syphax Reitt.**

— Tête à carène frontale très fine et à ponctuation forte, dense, subrugueuse. Yeux assez saillants par côtés. Pronotum très court, cintré, à angles antérieurs marqués, entièrement couvert d'une très forte ponctuation devenant subrugueuse vers les côtés. Pattes épaisses, tibias antérieurs à 3 grandes dents aiguës, sans denticules précédents, tibias postérieurs très élargis, épaissis en outre vers l'extérieur, à séries de spinules très disjointes (Fig. 3). Prosternum en carène rectiligne à stries internes indistinctes (? sous-genre des *Hypocacculus*) ..... **« Saprinus » Sphingis Peyerh.** (12)

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(11) Comprenant : *Chalcionellus* Reichd., *Zorius* Reichd., *Pholioxenus* Reichd., *Hypocacculus* Bickh. s. str. (*Toxometopon* Reichd., *Colpellus* Reichd., *Hypocacculus* Bickh. s. strictiss., *Paravolvulus* Reichd., *Nessus* Reichd., *Nannolepidius* Reichd.). — Cf. Reichardt, Beitr. z. einer Monogr. d. *Saprininae*, I. Teil, 1932. — L'« *Exaesiopus Grosclaudei* Norm. doit prendre place (*cf.* supra, I, § 5) dans la section *Nessus*, auprès de l'*H. hosseinius* Théry.

(12) Voir plus haut la description complète de cet insecte.

A Summary of the Egyptian Species of the Genus *Sarcophaga* with a description of *S. Rohdendorfi* nov. spec. (1)

(Diptera-Tachinidae)

(with Text-Figures 1-3)

by

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A Monograph on the Species of the Genus *Sarcophaga* in Egypt was published by the author in 1935. Seventeen species and one variety of these flies were fully described and their male terminalia illustrated. The author invited workers on the subject to review his work and communicate any criticism on the identity of the species to him. Since then Dr. J. Villeneuve of Rambouillet, and Dr. B. B. Rohdendorf of the Zoological Institute of the University of Moscow have written to the author.

Recently some new material of *Sarcophaga* was available at the Entomology Department of the Faculty of Science, the Egyptian University. Professor H. C. Efflatoun Bey very kindly lent it to the author for identification. On examining this material it was found to contain a new species of *Sarcophaga* from Hurghada (Red Sea coast). The description of this species together with the informations received from Dr. J. Villeneuve and Dr. B. B. Rohdendorf, to whom the author is very grateful for their trouble, have given me the chance to reopen the subject and also to revise the keys already given so as to include the new species.

Before proceeding to the subject I wish to express my thanks to Dr. M. Khalil Bey, Professor of Parasitology, Faculty of Medicine for the encouragement and keen interest he has taken in my work. My sincere thanks are due to Professor H.C. Efflatoun Bey who was kind enough to supply this material.

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(1) This paper is a sequal to my publication « The Egyptian Species of the Genus *Sarcophaga* » (Egyptian University Publications, No. 8).

The 18 species of the genus *Sarcophaga* already studied or described by the author were the following:

S. striata Fabr.; *S. Efflatouni* Salem; *S. mariutana* Salem; *S. Margaretti* Salem; *S. desertorum* Salem; *S. Fertoni* Villen.; *S. maculata* Meig.; *S. Roscllei* var. *novercoides* Böttcher; *S. spinosa* Villen.; *S. Khalili* Salem; *S. haemorrhoidalis* Fall.; *S. pharaonis* Rohdendorf; *S. carnaria* Meigen; *S. Surcoufi* Villen.; *S. hirtipes* Wiedmann; *S. falculata* Pandellé; *S. dux* var. *exuberans* Pand.; *S. Thomsoni* var. *aegyptiaca* Salem.

It has been thought advisable to revise what was already published by the author in his previous paper on the above species and they will be dealt with here in their respective order. Fresh measurements for the head will be recorded here. They are taken in all cases at the narrowest part of the frons where the inner eye-margins diverge instead of at the level of the seventh frontal bristle where they were taken in my previous work. It may be here added that more detailed descriptions are available in the author's first publication.

Sarcophaga striata Fabr.

A very easy species to distinguish.

Frontal bristles nearly parallel and numbering between 8 and 9. Second antennal segment nearly half the length of the third segment. Three post-sutural dorso-central bristles present. Costal bristle absent (if present it is always very small); first longitudinal vein bare. Crossed apical scutellar absent. First genital segment of grey pollinose colour.

This species was made the type of the genus *Ravinia* (Desvoidy, Dipt. Env. Paris, II, 434, 1863). The principal character of this genus is the course of the frontal bristles which diverge very little anterioly. This character is not so apparent in the male as in the female and there are also many species of *Sarcophaga* outside the genus which possess it. For this reason I preferred to keep this species under the genus *Sarcophaga*.

Sarcophaga setinervis Rond. (=Sarcophaga Efflatouni Salem, 1935).

Frons 1/2 the width of the eye. Parafrontals, each of almost 2/5th the width of the frontal stripe. Frontal bristles 6 pairs, crossed, and one other pair of reclinate bristles in front of the ocellar triangle. No lateral vertical are seen. Second antennal segment nearly equals the third in length. Thorax with three pairs of acrostichals in front of the suture and two pairs behind; the anterior pair of the latter being nearly 3/4th the length of the posterior pair. Scutellum with two pairs of marginal bristles, an anterior and a prosterior pair of nearly equal lengths; immediately in front of the latter is a strong pair of subapicals; no crossed apical present. Costal bristle well

developed. First and third longitudinal veins bristly ; segment III of costa nearly equals segment V. Second coxa without a comb but with some villosity on the under surface ; hind femora also villose and with some slender bristles on the under surface ; hind tibiae with little villosity on the inner margins and with some long slender bristles on the lower half of the inner side. Abdomen with grey tesselation and black round spots like *S. desertorum* Salem. Fifth sternite with a prominent brush of spines covering the whole surface.

This species was described by the author in 1935 under the name *S. Efflatouni*, but J. Villeneuve and B.B. Rohdendorf have since been kind enough to point out in the course of correspondence with the author that this species bears a great resemblance with *S. setinervis* Rond. It was not possible however to procure specimens of this latter species for comparison and, judging by the published descriptions alone it was found advisable, to let *S. Efflatouni* fall into synonymy.

The author would like to point out in this connection that the abovementioned species was thought to be new according to a key published by Senior-White (1924) and in which *S. setinervis* is stated as not possessing a bristly first longitudinal vein. The opposite is actually the case as can be seen from the descriptions of the species in question by Böttcher and others.

Sarcophaga mariutana Salem.

This is a very distinct species.

Vertex 4/5th the width of the eye. One pair of reclinate and eight pairs of crossed frontal bristles present. Second antennal segment nearly equals 3/5th the length of the third segment. Thorax, with three pairs of posterior dorso-central bristles. Crossed apical scutellar bristles rather weak. Second abdominal segment with pair of medium bristles. Apparent third segment with a row of bristles. Fifth sternite with a brush. No comb on the middle femora. Middle femora, posterior femora and hind tibiae villose. A row of bristles on posterior margin of the black first genital segment and a red hairy second genital segment. First longitudinal vein only with few bristles (2 or 3). Third longitudinal vein bristly with characteristic bristles on the anterior cross vein and one bristle beyond it. Costal bristle well developed. This species differs considerably, especially as regards the male terminalia from *S. ferox* Villen. In a letter to the author Dr. B. B. Rohdendorf writes that « *S. mariutana* Salem ist eine gute Art, mit *Pierretia* (*Hartigia*) *ferox* Villen. verwandt ». This settles the point and proves that the two species are only related to each other but not identical.

Sarcophaga Margaretti Salem.

This is also a distinct species.

Frons nearly 1/2 the width of an eye. Second antennal segment nearly equals 2/3rd the length of the third segment. Thorax with three posterior dorso-central bristles and scutellum with a pair of crossed apicals. Apparent second abdominal segment without median bristles. GS1. without a hind marginal row of bristles. Fifth sternite without any brush of spines but only with some stout bristles on the margins of the fork. First and third longitudinal veins bristly. Costal bristle present but not very long. Middle femora without a distinct comb and hind femora with a lower macrochaetal row. Dr. B. B. Rohdendorf pointed out to me that this species is identical with *S. destructor* Mall. = *flagellata* Vill. But differences between the two species have already been pointed out. According to Villeneuve, *S. flagellata* possesses a comb on the second femur and a brush of spines on the fifth sternite. No comb exists on the second femorae of *S. Margaretti* and it does not possess a brush of spines on the fifth sternite. Moreover the male terminalia of the two species are different. For these reasons I consider this species to be distinct from *S. destructor* Mall. and consequently new. *S. Margaretti* was found in specimens belonging to the Ministry of Agriculture, bred from larvae on tomatoe fruit and also on mellon's roots. The author also collected some specimens at Ein Gederat (Springs) in Northern Sinai.

Sarcophaga desertorum Salem.

This new species is also easy to distinguish.

Frons nearly 4/5th the width of one eye. Each parafrontal is nearly as wide as the frontal stripe. The median frontal bristles consist of one pair of reclinate bristles above, followed by five pairs of crossed bristles. Second antennal segment nearly equals half the length of the third segment. Thorax with three posterior dorso-central bristles and the crossed apical scutellar rather weak. A pair of acrostichal is also present behind the suture. Costal bristle very prominent. First longitudinal vein with only two bristles, one near the base of the vein and the other opposite the termination of the subcostal vein into the wing margin. Third longitudinal vein also bristly. Middle femora villous, with two strong bristles on the antero-ventral margin and without a comb. Hind femora also villous and with a lower macrochaetal row. Hind tibiae with a weak fringe of hairs on the inner side.

Abdomen grey with peculiar round black spots which are not constant but vary according to the incidence of light. Apparent second abdominal segment without median bristles. Apparent third abdominal segment with a pair of strong median bristles and one pair of marginal on either side. GS1. very elongated, of very dark brown colour and with a strong row of bristles on the posterior margin.

Second genital segment of dark orange colour and nearly as long as GS1. Fifth sternite with a brush of spines. Male terminalia allied to those of *S. mariutana*. The reader can refer to the original paper for more details about them.

Of this species only one male is known to me which was caught in the Suez Road on 12.11.1934.

Dr. B. B. Rohdendorf writes : « *S. desertorum* Salem its eine bona species aus der Untergattung *Hartigia*, der Gattung *Perretia* ».

Sarcophaga Fertoni Villen.

This is another desert species which is very variable in size. The males vary from 4-10 mm.

Vertex rather narrow, only 1/3rd the width of one eye and not 3/4th as mentioned in the first description. The frontal bristles are seven pairs of crossed bristles and one pair of reclinate ones. Bristles on the parafrontalia present but very fine and nearly continuous with the short line of facial bristles which separates the eye from the true face. Second antennal segment nearly of the same length as the third segment. Thorax with three pairs of well developed posterior dorso-central and a pair of acrostichal bristles behind the suture. Crossed scutellars present. Costal bristle very prominent. Vein I bare and vein III bristly. Middle femora with a well developed comb of spines. Hind femora with a well developed lower macrochaetal row of bristles. No fringe on tibiae. Abdomen with its apparent second segment bare. First genital segment elongate, brown and with a posterior row of bristles ; second genital segment of orange red colour and very hairy ; fifth sternite with a well developed brush of spines.

This species is very common in the Egyptian deserts. It occurs in Mariut, Suez Road, Helwan, Wadi el Rishrash, etc.

Sarcophaga maculata Meigen.

This is a very easy species to determine. In size it varies between 10-14 mm.

Frons equals 4/5th the width of one eye. Parafrontals, each 5/7th the width of the frontal stripe. Second antennal segment equals half the length of the third. Thorax with three pairs of posterior dorso-central bristles of which the hindmost is the strongest. In front of the suture there is on either side one pair of widely separated dorso-central bristles. Crossed apical scutellar bristles well developed. Costal bristle present ; first vein bare and the third bristly. Middle femora without a comb of spines but with a basal fringe of soft hairs. Hind femora with a row of bristles basally. Hind tibiae with a well developed fringe on both sides. Abdomen very characterestic ; viewed

with the head towards the observer, the background is grey with a pair of black round spots on the anterior margin of the apparent second, third and fourth segments and a longitudinal black stripe on the second and third segments. The two genital segments are black and very hairy. The first genital segment has no posterior marginal row of bristles and is very elongate. A brush of stiff bristles is present on the fifth sternite. This species is only recorded from Alexandria (Victoria) and Mariut.

Sarcophaga Rosellei var. novercoides Böttcher.

Frons nearly 7/10th the width of the eye. Each parafrontal is nearly 2/3rd the width of the stripe. Second antennal segment half the third. Thorax with three posterior dorso-central and a pair of acrostichal bristles which are rather weak. Crossed scutellar bristles present. Wings with a well developed costal bristle. First longitudinal vein bare and third longitudinal vein bristly. Segment III of costa double the length of segment V. Middle femora without a comb of spines. Middle tibiae without a fringe. A fringe and a medium row of macrochaetae are also present on the under surface of hind femora. Abdomen with its apparent second segment bare. First genital segment elongate and of black colour with some grey dusting and with a posterior row of bristles. Second genital segment also black with grey dusting. Fifth sternite with a brush of spines.

This species was found recently in Mariut and also occurs in some Wadis East of Helwan.

Sarcophaga spinosa Villen.

Frons half the width of one eye. Each parafrontal nearly 1/2 the width of the frontal stripe. Second antennal segment half the length of the third segment. Median frontal bristles 9 or 10. Thorax with three pairs of posterior dorso-central and one pair of acrostichal bristles behind the suture. Apical scutellar bristles present. Wings with a costal bristle. First longitudinal vein bare and the third vein bristly. Segment III of costa a little shorter than segment V. No comb on middle femora. Hind femora with a distinct lower macrochaetal row and a fringe. Hind and middle tibiae without fringes. The apparent second abdominal segment possesses a moderate pair of median bristles. Fifth sternite without a brush.

Sarcophaga Khalili Salem.

Frons nearly equals 3/7 the width of one eye. Parafrontalia each equals half the width of the frontal stripe. Median frontal bristles nine in number and of the same strength; all nearly parallel except the lower three pairs which become divergent near the antennal base. Two rows of fine small

bristles on the parafrontalia which descend down the face becoming confluent with the lower fronto-orbital row which is hardly present. Second antennal segment is nearly 3/7 the length of the third. Arista with hairs on both sides of its proximal half and is nearly 1 and 1/3 times as long as the third antennal segment. Second antennal segment yellowish-brown distally and dark brown proximally. Third segment dark grey. Ocellars rather weak. Parafrontalia and face yellowish grey. Palpi club shaped and of dark orange colour so is also the upper margin of the clypeus. Bristles on face and cheeks black. Behind and below the head is a profusion of white hairs. Acrostichals one to two pairs behind the suture. In front of the suture these bristles are difficult to make out from the surrounding hairs. Dorso-central bristles consist of two strong pairs and three weaker pairs behind the suture. In front of the suture about four long bristles can be distinguished on either side. Crossed apical scutellar present. Preapical bristles very strong. Sternopleural sometimes 3

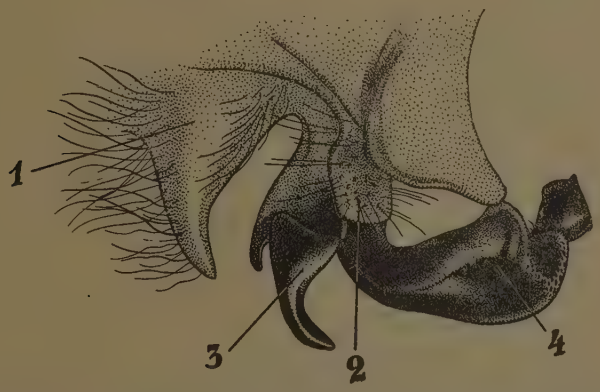

Fig. 1. — Male terminalia of *Sarcophaga Khalili* Salem : 1. First genital segment; 2, Accessory plate; 3. Anal cerci; 4. Phallosome.

arranged 1 : 1 : 1 or 4 arranged 3 anterior and 1 posterior. Propleura bare except for one strong bristle and several small ones on lowermost part. Notopleural 4. No costal bristle. Third longitudinal vein bristly and first longitudinal vein bare. Segment III of costa equals 1.6 times segment V. Abdomen dark grey with longitudinal black bands changeable with light incidence. Apparent second and third abdominal segments without median stiff bristles. Fourth segment with the usual posterior row of bristles. This segment is of grey colour anteriorly and orange posteriorly. First and second genital segments of orange colour, the latter possesses a pair of hump-like protuberances posteriorly. Fifth sternite with a small brush. Middle femora with a very strong comb of incrassated spines and a very well developed fringe. Hind femora with a fringe

of soft hairs and also two posterior rows of short stout bristles. Middle tibiae with dense fine hairs especially on the inner side. Hind tibiae nearly bare.

Dr. B.B. Rohdendorf writes to the author about this species: « *S. Khalili* Salem = novum genus Diese letzte stelltein besonders Interesse vor. Sie reprasen trert ein neue Gattung aus der Verwondsschaft von einigen amerikanischen Ravinine. Wir besitzen von der letzgenannten Tribus eine einzige paläarktische gattung und Art-*Ravinia striata* ».

It is evident from this that Dr. Rohdendorf considers it advisable to place this species in a new genus. The species is really very unique and interesting in certain important points which are as follows:

1. The course of the frontal bristles.

2. The absence of any stiff bristles from the apparent second and third abdominal segments.

3. The two hairy processes on the second genital segment and the fossae between each of these processes and the anal cercus.

4. The reduction in the size of the parameres and their relation to each other.

5. The unique appearance of the phallosome. The basal part or shaft is a very short segment. It can hardly be made out.

The distal portion makes up practically the whole of the visible part. It is made up of a wide forewardly curved convex plate of black to dark brown chitin with a projecting knob-like disc in the middle of the distal end. The basal part of the chitinous plate is rather narrow and the distal part is quite broad and serrated on the lateral edges.

6. The shape of the anal cercus and the accessory plate. For convenient understanding of these complicated terminalia, a drawing in profile from a dry specimen is included in this paper (see Fig. 1).

There is a great resemblance between this species and some American ones. *S. robusta* Ald. is very similar to *S. Khalili* Salem and a comparison of the two species is urgently needed. The palps are orange in *S. Khalili* and black in *S. robusta*. Frontal stripe reddish, face and bucca covered with white pollen in *S. robusta* Ald. Frontal stripe black, face and bucca golden yellowish in *S. Khalili*. Thorax yellowish grey pollinose in *S. robusta*. In *S. Khalili*, thorax grey without any yellow colour.

Sarcophaga haemorrhoidalis Fall.

Length 10 - 14ms. This is one of the easiest species to diagnose here owing to the absence of the posterior pair of acrostichal bristles on the thorax and the shape of the anal cerci.

Frons equals 3/5th the width of one eye. Each parafrontal equals 3/8th the width of the frontal stripe. Third antennal segment nearly twice the length of the second. Frontal bristles consist of a pair of reclinate ones posteriorly

and 10 pairs of crossed bristles anteriorly. Two rows of fine hairs on the parafrontalia.

Thorax without any posterior acrostichal bristles. Posterior dorso-central occur as two strong pairs and three weaker ones in front of the suture. Presutural acrostichals cannot be distinguished from other hairs. Presutural dorso-central bristles not well developed but three or four pairs can be made out. Crossed apical scutellar bristles present. Wings without costal spine. Third segment of costa nearly twice the length of segment V. First vein bare and third vein bristly. Middle femora with an abundance of soft long hairs on the proximal part of the under surface ; on the distal half of the same surface there are two rows of black short and thick spines. Middle tibiae nearly bare and with a long and stout black bristle on the outer side of its distal third. Hind femora with a fringe and a strong black row of bristles on the under surface. Hind tibiae with a fringe of soft hairs on either side. Abdomen with the usual tesselation. Apparent second abdominal segment bare. Third segment with a pair of central bristles. GS1. dark brown, covered with grey and with a posterior row of bristles. GS2. also dark brown. Fifth sternite without a brush of bristles. Anal cerci with two contiguous prominent elevated areas on the very proximal part of the posterior margin, separated from each other by a small depression. Male terminalia as described before.

Sarcophaga Rohdendorfi nov. spec.

Length : 11 mms. — Frons only a little wider than half the width of an eye. Frontal stripe equals the width of either of the parafrontals measured at the level where the inner eye margins begin to diverge. Third antennal segment nearly 1.8 times the length of the second. Five bristles arranged in two rows occur between the median vertical bristles and the inner eye margins. Frontal bristles 9 on each side of the stripe and three narrowly spaced bristles near the antennal base. Ocellar bristles not very strong. Palpi club-shaped, rather slender and of dark grey colour. Frons quite protruding when the head is viewed from the back. Thorax grey with three black stripes. Four posterior dorso-centrals ; the hind pair strong and the anterior pair weaker. One pair of posterior acrostichals. None of these in front of the suture. Four pairs of anterior sutural dorso-central. Crossed apicals present but not as strong as the subapicals. Sternopleurals 1 : 1 : 1. Wings with costal bristle present and well developed. Vein I bare. Vein III bristly for a good distance. Segment III of costa equals to segment V. Abdomen silvery grey with the usual tesselation. Apparent second abdominal segment with two median bristles. Third segment also with two stronger median bristles. Apparent fourth segment with a strong row of bristles on posterior margin. GS1. blackish with grey dusting and without any posterior marginal row of bristles. Its length equals its breadth. GS2. black and very hairy. Fifth sternite with a small brush of stiff bristles

on the inner side as well as with long marginal bristles. Abdominal sternites without outstanding bristles. A strong row of posterior marginal bristles and also a well developed fringe of soft hairs on hind femora. Hind tibiae nearly bare or showing a tendency to form a short fringe. A fringe present also on lower surface of middle femora; near the apex there is a row of bristles but not forming a typical comb. Tibiae II with strong bristles but no fringe.

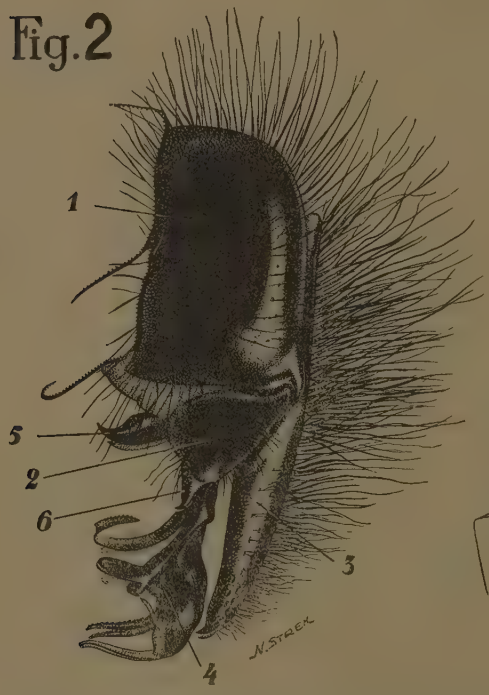

Fig. 2. — Male terminalia of *Sarcophaga Rohdendorfi* nov. spec.
Fig. 3. — Male terminalia of *Sarcophaga Rohdendorfi* nov. spec. from above.

1. First genital segment; 2. Accessory plate; 3. Anal cerci; 4. Phallosome; 5. Anterior paramere; 6. Posterior paramere; 7. Fifth sternite.

Terminalia of Male:

Anal cerci: Anterior margin nearly straight except for an incision near the apex. Posterior margin with a rather acute bend opposite the incision on the anterior margin. The apex thus becomes very pointed. All are of shiny black colour and very hairy up to the distal curve. They bear some resemblance to the anal cerci of *S. spinosa* Villen.

Accessory piece very dark brown, hairy, large and triangular.

Anterior and *posterior parameres* black and nearly equal. Anterior ones quite thick and stout. Posterior ones pointed and bent acutely.

Phallosome: End piece dark brown and swollen. It resembles very much the end piece of *S. pharaonis* and *S. dux*. On the distal end on either side of the median line is a pair of long thin chitinous slips originating from a short median piece. These strips of chitin are bent inward to meet and touch one another distally in the middle line. Immediately above is a stronger pair of similar but stouter serrated rods of chitin that keep nearly parallel to each other. Above these is a pair of broad flat thin plates attached to the lower side of the swollen distal end of the phallosome. Above these and originating from the ventral surface of the proximal part of the end piece is a pair of moderately broad apodemes. Each apodeme is directed at first downwards and then bends nearly at right angle outwards to end near the broad flat plates below it. Two males are known, both originating from Hurghada, captured by Professor H. C. Efflatoun Bey on 20.6.1935.

Sarcophaga pharaonis Rohdendorf.

Length 9-11 mms. — Frons equals 3/5th the width of the eyes. Parafrontalia narrow, just half the width of the frontal stripe. Second antennal segment equals 5/9th the third segment. Thorax with a pair of posterior acrostichals. Two strong pairs and three weaker pairs of posterior dorso-central bristles. Crossed apical scutellar present. Wings with a short costal bristle visible. First vein bare. Third vein bristly. Third costal segment longer than the fifth. Middle femora with a basal fringe and a moderate comb of short bristles. Middle tibiae bare. Hind femora with a basal fringe and a lower macrochaetal row of bristles. Hind tibiae with an inner fringe on its lower half. Abdomen practically unicolourous silvery grey with a pair of discal bristles on the third abdominal segment and a complete row of bristles on the fourth segment. GS1. and GS2. both black and hairy. Fifth sternite without a brush. Anterior borders of anal cerci always with characteristic short marginal hairs. This is a typical desert species and was described by Dr. B. B. Rohdendorf in 1933 from the desert of the Suez Road.

Sarcophaga carnaria Meigen.

A common species in Cairo especially Helwan, Abbassieh, etc. It is easy to distinguish owing to its black and silvery shimmering on the abdomen.

Frons nearly half the width of the eye. Each parafrontal which is yellow, is very narrow and equals nearly 1/4th the width of the frontal stripe. Second antennal segment nearly 3/5th the third segment. Thorax with four pairs of posterior dorso-central bristles and one pair of posterior acrostichals. Crossed apicals present. Wings with costal bristles present. Vein 1 bare, vein III

bristly. Segment III of costa longer than segment V. Middle femora with a comb of widely spaced short spines and a fringe. Middle tibiae with a very short fringe. Hind femora with a lower fringe and a strong macrochaetal row. Hind tibiae with a well developed fringe on the inner sides. Second abdominal segment always with a median pair of bristles. Third and fourth segments with the usual bristles. Male terminalia as described previously.

The closely allied species *S. vicina* Villen. does not occur in this country.

Sarcophaga Surcoufi Villen.

An uncommon species. Only known from Mariut and Mersa Matrouh districts.

Frons equals 7/10th the width of one eye. Each parafrontal nearly of the same width as the frontal stripe. Second antennal segment nearly 2/5th the third segment. Parafrontalia and face silvery white and the former with several rows of fine hairs. Back of head covered with an abundance of long snow white hairs. Thorax with only one pair of posterior acrostichals. Behind the suture there are four to five pairs of dorso-central bristles. Crossed scutellar present. Wings with a moderate costal bristle. Vein I bare; vein III bristly. Segment III of costa longer than segment V. Middle femora with a basal fringe and a moderate comb-like arrangement of short bristles on the lower distal part. Middle tibiae not fringed. Hind femora with a long fringe on the under surface above which are peculiar curved spines. Hind tibiae with a fringe of long soft hair. Abdomen with the usual tessalation of silver grey and black spots. GS1. orange with a posterior row of bristles. GS2. of the same colour. A small brush of spines present on the fifth sternite. Male terminalia as described previously.

Sarcophaga hirtipes Wied.

Frons nearly equals 4/5th the width of one eye. Each parafrontal nearly half the width of the frontal stripe. Second antennal segment about half the length of the third segment. Palpi stout, orange. Thorax with only one pair of posterior acrostichals and about five pairs of posterior dorso-centrals. Crossed apical scutellar bristles present. Wings with a weak costal bristle. Vein I bare and vein III bristly. Legs black. Middle femora with a basal fringe and a comb. Middle tibiae bare. Hind femora with a lower macrochaetal row and a fringe. Hind tibiae with a fringe on both sides. Apparent second abdominal segment sometimes with a weak median pair of bristles. Third segment with the usual bristles. GS1. and GS2. of the same colour, both red and hairy. Fifth sternite with no brush. This species is very common and is found in both the Nile Valley and the desert.

Sarcophaga falculata Pand.

A large common species. In size it varies from 10-15 mms.

Frons noticeably protruding and equals nearly 7/10th the width of one eye. Parafrontals yellow and each 5/7th the width of the frontal stripe. Second antennal segment nearly half the length of the third segment. Cheeks and parafrontalia yellowish. Thorax with one pair of posterior acrostichals and five pairs of posterior dorso-centrals. Crossed apical scutellar present. Wings with costal bristle very weak. Vein I bare and vein III bristly. Segment III of costa longer than segment V. Middle femora with a comb and a very well developed basal fringe. Middle tibiae bare. Hind femora with a fringe and a lower macrochaetal row. Hind tibiae with a long inner fringe of soft hairs. Abdomen with the usual tesselation. Apparent second segment with a weak pair of median bristles. GS1. brown and covered with grey pollinosity posteriorly and with a row of hind marginal bristles which is interrupted in the centre. GS2. always dark orange in colour. Fifth sternite with short stiff marginal bristles on the median sides of the fork but no typical brush can be made out. Anal cerci with characteristic short spines on lateral surface. The rest of the sternites are without outstanding bristles.

Sarcophaga dux var. exuberans Pand.

Length of male 8-15 mms.

Frons equals 2/3rd the width of one eye. Frontal stripe wide and black. Each parafrontal is golden and almost half the width of the frontal stripe. Antenna dark grey with the second segment 3/5th the length of the third segment. Face of the same yellowish colour as the parafrontalia, and with black bristles. The back of the head below the post-occipital black row is covered with white hairs. Palpi stout, club-shaped and dark grey like the antennae. Thorax with one pair of rather weak posterior acrostichal bristles. Five pairs of posterior dorso-central can be made out. Crossed apical scutellar bristles present. Wings with a small thick costal bristle. First vein bare, third vein bristly. Third costal segment equals 1 and 2/3rd the fifth segment. Middle femora with a fringe of hairs and a lower macrochaetal row. Hind tibiae with a fringe on both sides. Apparent second abdominal segment bare. Third and fourth segments with the usual bristles. GS1. dark brown, occasionally black and covered with grey pollinosity and without any hind marginal row of bristles. GS2. either of dark orange or rarely of black colour and thickly covered with long black bristles especially on the upper surface of the black anal cerci. Fifth sternite without a brush. The forks of the segment are of orange colour and possess stiff black marginal bristles. Other sternites do not possess outstanding macrochaetae.

This species is fairly common. Its larva was found in the eye of a patient

and was kindly presented to Professor Khalil Bey by the Ophthalmic Memorial Hospital.

The form that occurs in the desert differs from that of the Nile Valley in having the face and the parafrontalia silvery white instead of golden yellow. The lateral processes at the end of the phallosome in the former have always a small sharp tooth on the middle whereas the country forms have these lateral processes bluntly forked at their end. These differences in my opinion are not worthy of a varietal name.

Sarcophaga aegyptiaca Salem (=Sarcophaga dux var. aegyptiaca Salem).

Frons 5/9th the width of one eye. Each Parafrontalia half the width of the frontal stripe. Second antennal segment 3/5th the length of the third segment. The rest of the description agrees completely with *S. dux* var. *exuberans* Pandl. except that the hind tibiae of *S. aegyptiaca* are not so well fringed as in *S. dux* var. *exuberans*. The main differences between the two species are however to be found in the male terminalia. The differences between the two varieties is so striking that Dr. B. B. Rohdendorf suggested raising it to specific rank, a suggestion to which I agreed. This species was found both in Alexandria and Cairo. A description of the male terminalia has been already published.

Key to the Egyptian Species of Sarcophaga Meigen

The finding of a new species of *Sarcophaga* here as well as the alteration regarding some species necessitated some change in the keys already published. The present key includes nineteen species, of these nine species have only three posterior dorso-central bristles and the rest always possess more than this number. Of the former group it is interesting to note that the crossed apical scutellar bristles are absent in two species, *S. striata* and *S. setinervis*. In the latter group these bristles are not absent in any species. It is also interesting to note that all the species with more than three posterior dorso-central bristles have the first longitudinal vein always bare.

I. Key based on external characters and only applicable to Males.

1. Species with three posterior dorso-central bristles on the thorax 2

— Species with more than three posterior dorso-central 10

2. Fifth sternite with a brush of spines 3

— Fifth sternite without a brush of spines 9

3. Crossed apical scutellar bristles always absent 4

— Crossed apical scutellar bristles always present 5

4. Costal bristle very weak or absent, first longitudinal vein bare .... *striata* Fabr.

— Costal bristle present and well developed. First longitudinal bristly .... *setinervis* Rond.

5. First longitudinal vein with bristles 6

— First longitudinal vein entirely bare 7

6. A small species. — Third longitudinal vein only with a few bristles (4 or 5) near its base, not extending far on the vein . *S. desertorum* Salem

— A large species. — Third longitudinal vein with several bristles (7 to 8) extending down to the anterior cross vein and with one bristle on this cross vein and also a second bristle beyond it ..... *S. mariutana* Salem

7. Frons very narrow, 1/3rd the width of one eye ..... *Fertoni* Villen.

— Frons wide, 2/3rd the width of one eye or more 8

8. Abdomen with small black spots more or less fixed in position .... *maculata* Meig.

— Abdomen with changeable pattern according to incidence of light .... *rosellei* var. *novercoides* (Bött.)

9. First longitudinal vein bristly ..... *Margaretti* Salem

— First longitudinal vein bare ..... *spinosa* Villen.

10. Apparent second and third abdominal segments without bristles on the centre of the posterior margin. GS1. with a pair of hump-like processes just before the root of the anal cerci ..... *Khalili* Salem

— At least the appearent third abdominal segment always with one pair of median bristles on the posterior margin. GS2. normal and without humps before the anal cerci 11

11. Praescutellar acrostichal bristles always absent. Anal cerci somewhat S-shaped ..... *haemorrhoidalis* Meig.

— Praescutellar acrostichal bristles always present 12

12. Abdomen silvery grey, practically unicolourous ..... *pharaonis* Rohd.

— Abdomen with the usual tesselation 13

13. Fifth sternite with a small brush of spines 14

— Fifth sternite without such a brush 15

14. Third costal segment longer than the fifth segment. The frontal stripe is rather narrow being less than either of the parafrontalia. Apparent second abdominal segment without median bristles. Abdominal pattern silvery grey with black spots. GS1. and GS2. orange .. *Surcoufi* Villen.

— Frontal stripe wider and as broad as either of the parafrontalia. — Fifth segment of costa nearly equals the third segment. Apparent second abdominal segment with median bristles. Abdominal pattern normal. GS1. black, covered with grey pollinosity and GS2. entirely black .... *Rohdendorfi* nov. spec.

15. Each parafrontal narrow and equals only 1/4th the width of the frontal-stripe. Abdomen with a lot of black tesselation ..... *carnaria* Meig.

— Each parafrontal equals at least 1/2 the with of the frontal stripe 16

16. Palpi of light orange colour. Apparent second abdominal segment usually with a weak pair of median bristles ..... *hirtipes* Wied.

— Palpi dark grey or brown in colour. Second abdominal segment bare .. 17

17. GS1. with a hind marginal row of bristles which is interrupted in the middle. Anal cerci short, broad and with a hump on the hind margin .... *falculata* Pand.

— GS2. without any hind marginal bristles. Anal cerci with nearly straight edges except for an incision on the distal end of the anterior margin ..... *dux* var. *exuberans* Pand. or *aegyptiaca* Salem

II. Key based on characters of the Male Terminalia only.

1. Anal cerci with hump-like protruberances immediately in front of them and with a shallow fossa between each hump and the base of each of the anal cerci. Parameres very much reduced in size and only visible after dissection ..... *Khalili* Salem

— Anal cerci without any protruberances or fossae before their bases. Parameres always visible and of normal size 2

2. Posterior parameres with distinct serrations on the anterior margin especially near the hooked apex. Apical part of end piece dome-like .... *striata* Fabr.

— Posterior parameres without such serrations 3

3. Anal cerci, viewed in profile, always with a distinct tooth on the posterior margin near the apex 4

— Anal cerci, viewed in profile, either with a distinct broad hump on the posterior margin or this margin is evenly curved to the apex 6

4. Phallosome with a median pair of elongated straight bars of chitin, the pieces of which have small denticles. These bars are attached to the proximal part of the ventral surface of the end piece and are directed straight downwards. Shaft of phallosome much longer than end piece. The distal part of the end piece possesses two pairs of short curved processes ..... *Surcoufi* Villen.

— Phallosome with only a single median apodeme attached proximally on the end piece. The latter is longer than the shaft of the phallosome .. 5

5. Basal median apodeme on the swollen proximal part of end piece short and curved. Below this are, a pair of short lateral processes and a long curved median one ..... *desertorum* Salem

— Basal median apodeme on the swollen ventral surface of end piece of phallosome long and spathulate. Below it are two pairs of long lateral apodemes and a long median one ..... *mariutana* Salem

6. Anal cerci slender (almost S-shaped) and with two small processes on the proximal part of the posterior margin. Phallosome with the end piece short and forewardly curved and above it two hook-like apophyses ..... *haemorrhoidalis* (Fall.) Meigen

— Anal cerci not S-shaped and without the above mentioned processes proximally 7

7. Anal cerci, viewed in profile, with broad humps on the posterior margin 8

— Anal cerci, viewed in profile, with the posterior margins evenly curved to the apex 14

8. Anal cerci with the humps situated distally near the apex. The apex is a small sharp point in the middle of the transversely truncate distal end ..... *spinosa* Villen.

— Anal cerci with the hump situated proximally on the posterior margin. Apex of anal cerci of normal shape 9

9. Accessory plate narrow and elongated or nealy ribbon-shaped. Posterior parameres considerabbly longer than the anterior ones. End piece of phallosome with a strawberry-like cap .. *Rosellei* var. *novercoides* Bött.

— Accessory plate of ordinary shape, being either oval or triangular 10

10. Ventral proximal part of end piece membranous and with a pair of narrow curved horn-like processes below the swollen part ..... *hirtipes* Wied.

— Ventral proximal part of end piece not so swollen and without the curved horn-like processes 11

11. Curve on posterior margin of anal cerci very gradual. Anal cerci with very long and with abundant hairs on the posterior margins. Accessory plate relatively large. Tip of phallosome blunt and with only two arm-like apophyses above it. Posterior paramere longer than the anterior one .. .. *maculata* Meigen.

— Curve on the posterior margin of anal cercus not so gradual. End piece more complicated. Parameres either of nearly equal lengths or the anterior pair is longer than the posterior 12

12. Anterior and posterior parameres of nearly equal lengths. Tip of anal cercus blunt. End piece with some curved rods and lobes attached to its distal part ..... *setinervis* Rond.

— Anterior parameres longer than the posterior ones 13

13. Anal cercus short and with characteristic short spines on its lateral surface especially near the outer margin. Attached part of anal cercus and the part below this very hairy. Apex very blunt. Anterior paramere with short hairs on its posterior surface. Phallosome with a non-stalked triangular plate on the ventral proximal part of end piece ..... *falculata* Pand.

— Anal cercus with the apex not so blunt and without the above mentioned short spines. Anterior paramere with long hairs on its posterior surface. Phallosome with its end piece shaped like the bow of a ship and with a curved lateral plate on either side of a central one ..... *Fertoni* Villen.

14. Apex of anal cercus lying opposite the joint between the shaft and end piece of phallosome 15

— Apex of anal cercus lying far down nearly opposite the distal part of end piece; the joint between the two parts of the phallosome being situated at a much higher level 16

15. Posterior paramere longer than the anterior one. Anal cerci not very hairy. Basal tubular part of phallosome without transverse striations on its ventral surface ..... *Margaretti* Salem.

— Anterior paramere much longer than the posterior one. Anal cerci very hairy. Basal part of phallosome (shaft) with transverse striations on its

ventral surface ..... *carnaria* Meigen.

16. Ventral part of end piece of phallosome without membranous or semi-membranous swelling on its proximal part, but with a pair of strongly curved apophyses, below which are a pair of small leaf-like flat lobes, and most distally on the end piece two pairs of unbranched rod-like apodemes ..... *Rohdendorfi* nov. spec.

— Ventral part of end piece with a semi-membranous swelling on the proximal part. Attached distally on the end piece are two pairs of rod-like apophyses 17

17. Anterior borders of anal cerci with characteristic small marginal hairs. Swollen plate on ventral proximal part of end piece with two finger-like processes attached on lower margin of the swollen lobe and pointing downwards. Below this membranous plate are two pairs of elongated narrow processes, the proximal pair of which is paler than the distal pairs and dentated on the whole of the ventral margin. The distal pair is forked ..... *pharaonis* Rohd.

— Anterior borders of anal cerci without these marginal hairs, being entirely bare. Semi-membranous plate of phallosome without finger-like processes 18

18. Terminal lateral rod-like apophyses attached to the distal part of end piece flat, leaf-like and showing no teeth or forks .... *aegyptiaca* Salem

— Terminal lateral apophyses on the distal part of end piece always either forked at the end or with a sharp small tooth-like process .... *dux* var. *exuberans* Pand.

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* *

Since this paper was written the author had a chance of examining certain specimens in the British Museum (Natural History) and in the collection of Dr. J. Villeneuve of Rambouillet (France) and has ascertained the following synonymy:

1. *S. ferox* Villen. = *S. mariutana* Salem.
2. *S. destructor* Mall. = *S. flagellata* Villen. = *S. Margaretti* Salem.
3. *S. robusta* Ald. = *S. Khalili* Salem.

I prefer to drop this species from our list of Egyptian *Sarcophaga* as I think that the specimen in my collection came from Jamaica and was added to the collection by Dr. A. Halawani who had been to the Island.

Séance du 11 Novembre 1936

Présidence de Monsieur H. C. Efflatoun Bey, *Vice-Président.*

Aphanogmus steinitzi spec. nov., ein Coniopterygiden-Parasit

(Hymenoptera-Proctotrupoidea)

(mit 6 Text-Figuren)

von H. Priesner (Cairo).

Aphanogmus steinitzi spec. nov.

♂ : Schwarz; Fühler dunkel, die geschnürten oder stielförmigen Apikalteile der Fühlerglieder 3-7 gelb, die Glieder 8 oder 9 bis 11 ganz dunkel; Mandibel am Ende gelblich. Costa und Marginalis des Vorderflügels bräunlich, Radialis gelblich, kaum oder nur schwach getrübt, die *Flügelfläche hyalin*, ohne Spur einer Verdunkelung oder Querbinde. Beine dunkel, Basis und Enden der Tibien hellgelb, Tarsen ebenso, doch das 5. Glied (oder bisweilen auch noch das 4. Gl.) dunkel oder getrübt. Bei trocken präparierten Exemplaren sticht die gelbliche Färbung der Endabschnitte der mittleren Fühlerglieder und die der Tibien und Tarsen weniger ab, als bei Exemplaren, die in Balsam präpariert sind.

Kopf breit und gross (Breite bei grossen Stücken 0.45 mm, bei kleinen 0.41 mm.), breiter als der Thorax (0.39 mm. ohne Tegulae); Augenlänge etwa 216 μ, bei kleinen 155 μ; Kopf fein chagriniert, matt, fein grau-weisslich, etwas flaumig behaart; Augen spärlich, aber deutlich behaart; Scheitelhinterrand, besonders seitlich, scharf. Genae lang, 120-140 μ; Innenabstand der hinteren Ocellen grösser als ihr Abstand von den Augen; jede Mandibel mit zwei scharfen End-Zähnen; Endglied der Maxillarpalpen schlank, fast spindelförmig, etwa 65 μ lang; Breite der Oberlippe 108-112 μ. Fühlerlänge etwa 1.21 mm; Glied 1 flaschenförmig, hinter der Basis dick, gegen das Ende aber stark flaschenförmig verengt, Breite 60-65 μ; 3 Glied länglich, seitlich fast gleichbreit, am Ende halsförmig geschnürt, mit drei

Aphanogmus steinitzi spec. nov. :

Fig. 1 : Fühler des ♂. — Fig. 2 : Vorderflügel des ♂. — Fig. 3 : Hinterbein des ♂. — Fig. 4 : Fühler des ♀. — Fig. 5 : Notalplatten des Thorax, lateral, des ♂. — Fig. 6 : Kopf-Umriss des ♂.

Wirteln sehr langer (bis 160 μ), dunkler Haare; das 4.-7.-8. Glied nach unten mehr weniger stark beilförmig verlängert (Fig. 1), das 5.-7. ausgesprochen beilförmig, mit nicht ganz regelmässig in 2-3 Wirteln angeordneten, hauptsächlich nach unten (aussen) gerichteten Haarborsten; das Fühlerendglied nahezu spindelförmig. — Fühlergliedermasze der Type: 180-196(60-65), 60(36), 114(32), 120(38), 100-105(44), 100-105(44), 100(40), 94(38), 92(38), 88(36), 112-120(32) μ. — Thorax-Oberfläche schwach glänzend, chagriniert, fein und zerstreut weisslich behaart; Mesonotum mit deutlicher, vollständiger Mittelfurche, Seitenfurchen ganz obliteriert; Scutellum in der Skulptur mit dem Mesonotum übereinstimmend; Frenum scharf abgegrenzt, durch zwei Bogenfurchen, die sich schon vor der Mesonotum-Basis vereinigen und am Grunde stark glänzen; Scutellum-Mittelteil gewölbt, ringsum scharf gerandet, am Ende in ein kleines Zäpfchen (Fig. 5) ausgezogen: grosse Exemplare messen vom Thoraxvorderrand zur Scutellumspitze 0.52-0.56 mm. (Mesonotumlange 216-225 μ); Pleuren glatt, glänzend. Das viel kleinere Abdomen ist 0.42-0.55 mm. lang, etwa 310 μ breit, seine Oberfläche stark glänzend, an der Basis bogenförmig scharf gerandet, der Rand mit sehr kurzen, wenig deutlichen Fältchen. Flügellänge: Flügelbreite = 0.95: 0.37-0.4 mm.; Marginalis: Radialis = 104-121: 138-173 μ; Radialis leicht gebogen, zum Ende leicht erweitert; Flügelendfransen mässig lang (Fig. 2), Fläche gleichmässig beborstet mit Ausnahme eines schmalen borstenfreien Raumes hinter der Costa + Marginalis; in der Basalhälfte hat die Costa eine Borstenreihe hinter sich, die dann im Endabschnitt auf die Costa selbst übergeht; mikroskopisch betrachtet, besteht die Costa aus zwei Teilen, von denen der lange, basale Abschnitt aus kleinen, meist dreieckigen Chitinstückchen zusammengesetzt ist, während der distale Teil, der kürzer (68-72 μ lang) ist als die Marginalis, so wie diese aus einem ganzen Chitinstück besteht; dieser Abschnitt trägt 3-4 Borsten, während die Marginalis mit 4-5 langen Randborsten (ausser mehreren kürzeren) versehen ist. Beine: Vordertibien (0.2 mm.) mit einem längeren und einem kürzeren Kammsporn; Vordertarsen (ohne Klauen) 225-240 μ lang; Glieder: 115-120, 32-36, 28, 26, 36-40 μ; Hintertibien 277-295 μ, 1. H.-Tarsenglied 144-152, die übrigen zusammen 168-172 μ, das dunkle Endglied 52-56 μ. — Gesamtkörperlänge: 0.77-1.04 mm.

♀: Ausgefärbte Exemplare sind schwarz, wobei das Abdomen etwas bräunlich sein kann; unreife Stücke können bräunlich sein, mit wenigstens unterseits bräunlichgelbem Abdomen, graugelben Beinen und Fühlern mit getrübtem Schaft; bei ausgefärbten Stücken ist der Schaft immer dunkel, das geschnürte Ende gelb, die Geissel gelblich, immer mit Trübungen, die Keule dunkel. Färbung der Beine und Flügel wie beim ♂.

Skulptur und Behaarung wie beim ♂; Kopfbreite: Thoraxbreite = 380: 310 μ; Abdomenbreite 310 μ; Augenlänge sowie Wangenlänge 138 μ; Fühler

mit 3-gliedriger Keule, da das 7. Glied — in der Grösse zwar ein Mittelglied zwischen 6. und 8. — schmäler und viel kürzer ist als das 8.; 1. Glied (Schaft) ähnlich wie beim ♂, das 2. viel länger als das 3., die folgenden abnehmend kürzer und dicker, das 8. und 9. Glied wenigstens am Aussen (Unter-) rand deutlich etwas länger als breit, untereinander etwa gleichlang, das Endglied viel länger; die Glieder sind — wenigstens vom 7. an — am Unterrande *gekielt*, der Kiel am Ende etwas eckig vergezogen (in mikroskopischer Ansicht); Masze: 220(60-65), 92(28), 60(22), 50(28), 42-44(30), 44(34), 44(40), 62-64(48), 62-64(48), 108-112(50) μ. Thorax wie beim ♂, die Flügel überragen das Abdomenende, Seiten des Thorax glatt und glänzend, Metathorax ohne Lateralzähnchen, Thoraxlänge vom Vorderrande zur Schildspitze 340-415 μ. Hintertibien etwa 225-260, Hintertarsen 260-310 μ lang. Der einheitliche Endteil der Costa (mit 3 Borsten) 60-64 μ lang, Marginalis 108-112, Radialis deutlich etwas gebogen, 136 μ. Vorderflügelbreite: 295 μ. — Gesamtkörperlänge: 0.86-1.04 mm.

Diese neue Art ist im männlichen Geschlechte von den bisher bekannten Arten durch die deultiche Mittellinie des Mesonotums, bei gleichzeitig überaus stark erweiterten mittleren Fühlergliedern (ähnlich wie bei *Lygocerus*) hinlänglich verschieden; etwas schwieriger ist es, das ♀ von den bisher beschriebenen zu trennen, da die Beschreibungen ganz unzulänglich sind; von den Arten, die eine deutliche Mittellängslinie des Mesonotums haben, hat *compressus* (Ratz.) keine deutliche Fühlerkeule, und die Pleuren sind gestrichelt; *compressiventris* (Först.) ist eine kleinere Form (0.6 mm) und das Abdomen ist seitlich ziemlich stark zusammengrdrückt, der Fühlerschaft ist rötlichgelb; der letztere ist ein sicherlich spezifischer Unterschied, da auch bei unreifen *steinitzi* der Fühlerschaft getrübt ist. Ich habe noch mit einer grossen Reihe anderer, von mir gesammelter, neuer *Aphanogmus*-Arten verglichen, von denen keine mit dieser hier beschriebenen, *Lygocerus*-ähnlichen Form identisch ist.

Fundort: Eine Serie beider Geschlechter dieser Art wurden von Herrn E. Steinitz (Jerusalem) in Petach Tikvah, aber wohl auch anderwärts in Palästina, aus Puppen von Coniopterygiden erhalten, speziell einer *Conwentzia* spec. Biologische Notizen hierüber werden von Herrn Steinitz selbst veröffentlicht werden.

Notes sur les *Hockeria*, avec description d'une nouvelle espèce d'Egypte

(Hymenoptera-Chalcididae)

par Luigi Masi (Gênes)

Monsieur W. Wittmer, au cours de ses chasses entomologiques effectuées l'année dernière en Egypte. Sinaï et Palestine, pour compte de S.A.S. le Prince Alessandro C. Della Torre e Tasso, a récolté quelques Chalcidides qu'il m'a obligeamment confiés pour l'étude. Je lui en exprime ici toute ma gratitude, car j'ai eu le plaisir de trouver, dans le petit lot examiné, outre un mâle et une femelle d'un nouveau genre du groupe des Chalcodectini recueillis au Sinaï et que j'ai déjà décrit (1), la femelle d'une nouvelle espèce de *Hockeria* d'Egypte. J'avais précédemment vu deux autres femelles de cette nouveauté dans l'importante collection des Chalcidinæ égyptiens appartenant à la Société Royale Entomologique d'Egypte. Monsieur A. Alfieri m'avait communiqué cette collection en vue de la rédaction d'une étude monographique de ce groupe. Cependant, une pareille étude exigerait un temps bien plus long que celui dont je dispose. D'autre part, le genre *Hockeria* étant un des derniers dont j'aurais eu à m'occuper, j'estime faire œuvre utile en publiant, dès maintenant, la description de cette nouvelle espèce. Ce qui m'engage encore dans cette voie, c'est que je puis, d'ores et déjà, faire connaître les résultats d'une étude comparative des espèces proches alliées de celle d'Egypte et de ses variétés, et apporter les corrections et les compléments nécessaires à mes études précédentes.

Un examen préliminaire de quelques spécimens de différentes espèces de *Hockeria* est suffisant pour démontrer combien il s'agit d'un genre difficile à débrouiller à cause de l'uniformité des caractères morphologiques et de la variabilité individuelle de coloration. De plus, nous ne savons pas encore le sens qu'il faut attribuer aux dénominations de *Hockeria* et *Haltichella*. J'ai traité cette question dans un article publié dans le Bollettino della Società Entomologica Italiana (2) et je crois utile de résumer ici ma discussion longue et compliquée d'alors.

Spinola, en 1811, a établi le genre *Haltichella* dans son « Essai d'une classification des Diplolépères » (Ann. Muséum Hist. Nat., Paris, XVII, p. 148), indiquant quelques caractères qui le divisait en deux groupes, le

(1) Boll. Soc. Entom. Ital., vol. LXVIII, 1936, pp. 67-71.

(2) Masi (L.) : Sul significato del genere *Haltichella* Spinola. — Boll. Soc. Entom. Ital., vol. LXI, 1929, p. 11-16.

premier comprenant les *Chalcis bispinosa* et *pusilla* de Fabricius, *Ch. armata* Panzer, *Ch. Dargelasii* Latr. et *Haltichella sanguinipes* sp. nov. (celle-ci inédite) ; le second comportant seulement l'*Haltichella aterrima*, espèce également inédite. Ce genre de la classification de Spinola était très hétérogène et il fut bientôt nécessaire de le diviser. Le nom de *Haltichella* aurait dû être réservé à la première espèce mentionnée, c'est-à-dire à celle que Spinola appellait *Chalcis bispinosa* Fabr. ou *Haltichella bispinosa* (Fabr.). J'ai vu 5 femelles et 1 mâle de la collection Spinola (Musée de Turin) ainsi nommés : il s'agit d'une espèce commune, à coloration noire, pattes et antennes partiellement rougeâtres, ailes antérieures sans taches brunes mais seulement tachées de gris pâle ; le front, légèrement excavé, visiblement bordé tout le long de la marge orbitale interne ; le fémur de la troisième paire un peu plus de deux fois plus long que large, ses deux lobes ventraux presque oblitérés ; la nervure post-marginale à peu près aussi longue que la marginale ; en outre, insertion antennaire près de la bouche, deux éperons aux tibias postérieurs. Il s'agit d'un véritable genre d'*Haltichellinae*.

Cependant, Walker (1834) et Westwood (1840) ont attribué le nom *Haltichella* (corrigé en *Halticella*) à la *Chalcis pusilla* Fabr. Je crois pouvoir affirmer que la *Chalcis pusilla* Fabr. n'a rien de commun avec les *Haltichellinae*, elle appartient aux *Brachymeriinae* et au genre *Brachymeria* (= *Chalcis* Auct.). L'indication donnée par Fabricius pour le fémur postérieur : « puncto apicis albo » ; la description qu'en a fait Walker ; les figures dans l'article de révision des Chalcidines par Kirby (1883) ; certains exemplaires de la collection Spinola conservés à Turin et étiquettés du nom de *Ch. pusilla*, et ce que Spinola dit lui même : « Habitat cum *Chal. minuta*, forte ejusdem mera varietas » — sont autant de preuves qu'il s'agit d'une *Brachymeria*.

Il faudrait donc, ou bien abolir le genre *Haltichella* et la dénomination *Haltichellinae*, ou bien établir une nouvelle désignation d'espèce génotypique, celle de *Haltichella bispinosa* (Fabr.?) Spinola. Dans le premier cas, le genre *Hockeria* Walker (1834) viendrait remplacer *Haltichella* et serait représenté par l'espèce *Hockeria bispinosa* (Fabr.?) Walker, qui est bien différente de *Haltichella bispinosa* Spinola et s'en distingue, à première vue, par les ailes antérieures de la femelle avec taches brunes et deux taches blanchâtres. Les *Haltichellinae* seraient nommées *Hockeriinae*.

En décrivant quelques espèces nouvelles, j'en ai trouvées qui n'avaient pas tous les caractères typiques de *Hockeria* ou de *Haltichella*. Ainsi donc, quelques doutes sur la séparation nette de ces deux groupes subsistent encore et compliquent cette question taxonomique, que de nouvelles observations et découvertes d'espèces devra résoudre. En effet, on peut observer des espèces, *Halt. luzonica* mihi par exemple, sans concavité faciale, comme chez les *Hockeria*, mais avec la nervure post-marginale longue et le fémur postérieur grêle ; cependant, la post-marginale est parfois longue également chez les

Hockeria (*H. afra* mihi) et souvent on ne peut préciser sa limite ; le fémur postérieur est sujet à des variations individuelles dans sa largeur en proportion avec sa longueur. Si donc les deux genres *Haltichella* et *Hockeria* doivent être réunis, la priorité sera conservée par le premier des deux noms.

J'adopte ici le genre *Hockeria*, tel qu'il a été défini par Walker en 1834 (Entom. Mag. II, p. 34), prenant comme génotype la première espèce mentionnée, une femelle décrite (p. 35) par cet Auteur. Je crois que la *Hockeria* que j'ai décrite dans mon travail sur les « Calcididi del Giglio », prima serie (Ann. Mus. Civ. Genova, vol. XLVII, 1916, pp. 104-109), et dont je me sers pour la comparaison en étudiant les autres espèces, est réellement celle que Walker nommait *H. bispinosa* (3).

Hockeria aegyptiaca spec. nov.

Specimina 3 ♀♀ : Ogret el Sheikh, 22.I.1932, *Typus!* — Ain Suchara, 17.II et Hamman 15.III.1935, leg. W. Wittmer.

Diagnosis. — Femina : *H. bispinosae* Walker similis. Proalae sicut in hac specie maculis duabus fuscis in disco coniunctis et maculam albidam anteriorem aliamque hyalinam posteriorem limitantibus ornatae. Tegulae, genua, tibiae apice, coxae posticae superne, femur posticum prope lobum apicalem, tarsique omnes rufo-ferruginea ; antennarum annellus, articulus tertius basim versus, plus minusve rufescentes ; pedicellus niger, scapus plerumque basi rufus. Oculi pubescentes. Thoracis dorsum nitidum ; mesonotum foveolis punctiformibus spatio inter se distantibus fere ubique ipsarum diametro aequali. Scutellum paullo latitudine sua brevius, limbo (in forma typica) angusto, minus conspicuo, circumdatum, extremo apice quasi obtruncato, interdum leniter tantum excavato. Metanotum fovea media lateribus parallelis, vel anguste spatulata, parte angustiore deorsum versa ; inter foveam et margines fimbriatos areolis biseriatis. Nervus postmarginalis limite incerto, 1/3 circa marginalis aequans. Femur posticum denticulis 25-26 armatum. Abdominis tergitum primum laeve. Long. 3 mm. — Mas ignotus.

Habitat : forma typica in Aegypto inventa est. Varietates in Aegypto et Cyrenaica.

La conformation et la sculpture de la tête comme chez *H. bispinosa* Walk. Carènes des joues subtiles, atteignant les yeux. Pubescence cornéale

(3) A propos de la ressemblance entre les *Haltichella* et les *Hockeria*, je fais remarquer ici que la *Haltichella decipiens* mihi, dont j'ai décrit deux femelles provenant de Mindanao, Philippines, pourrait être confondue avec une femelle de la *Hockeria aegyptiaca* ; cependant, un bon examen permet de constater qu'elle en diffère beaucoup, ayant les yeux lisses, le front bordé latéralement, la nervure marginale non moins longue que la marginale, le fémur postérieur moins robuste, presque elliptique.

bien visible à × 50. Fouet antennaire légèrement et graduellement épaissi jusqu'à 2/3, comme chez *H. bispinosa* et, comme chez cette espèce, plus long que la largeur de la tête dans la proportion de 122:100. Deuxième article du fouet (3e antennaire) carré ou à peine plus long que large, le suivant un peu plus court que le pédicelle, le dernier 2/3 du 2e et 1/2 de la massue. Dimensions proportionnelles : pédicelle 12 1/2 ; annelet 5 ; 1er article du funicule long 10 et large à l'extrémité 6 ; longueur du 2e article du funicule 9 ; le 7e long 7 et large 6. Sur le scutum on compte 9-11 points pilifères disposés sur une ligne longitudinale ; ils sont un peu plus gros et moins éloignés sur l'écusson ; tous les interstices apparaissent luisants et finement réticulés, mais cette sculpture est moins évidente que chez l'espèce *bispinosa*. Les soies marginales de l'aile antérieure sont deux fois plus longues que celles de la surface. Le fémur de la 3e paire des pattes, elliptique, mesure en largeur 47% de sa longueur, son lobe médian non compris, et 53% avec ce lobe ; celui-ci est obtusement triangulaire et peu proéminent, son sommet à 57% de la longueur fémorale. L'abdomen est ovoïde, à pointe aiguë, aussi long que le thorax ; son 1er tergite atteint à peu près la moitié de la longueur ; le 6e dans toute sa surface, les tergites 2e-5e sur leurs côtés, sont visiblement réticulés-écailleux ; la portion moyenne des tergites 2e-5e a une réticulation peu apparente.

La forme typique de cette espèce se distingue de *H. bispinosa* Walk. par la pubescence des yeux présente chez la femelle (cette pubescence manque presque complètement chez la variété de la Cyrénaïque) ; en outre, les écaillettes sont rougeâtres et cette coloration est beaucoup plus étendue sur les pattes ; l'anneau et la moitié basale de l'article suivant des antennes ont une tendance plus ou moins marquée vers la couleur rouge ; les points pilifères sur le dos du thorax sont moins rapprochés et les interstices qui les séparent plus luisants ; l'écusson est moins large, avec un bord étroit et très peu apparent sur les côtés, d'ordinaire sans trace des deux pointes obtuses apicales ; les aréoles du métanotum (propodeum), de chaque côté de la fosse médiane, sont plus régulières et plus régulièrement disposées ; les petites dents fémorales sont moins nombreuses, 25-26 au lieu de 33-34.

Cette espèce assume deux variétés, représentant peut-être aussi des sous-espèces :

Var. scutellaris. — Diffère de la forme typique par le bord de l'écusson moins étroit et bien apparent ; par ses pattes en grande partie rougeâtres. La pubescence des yeux est bien développée.

Type : 1♀ de Helwan, 3.XII.1932.

Var. libyca. — Pubescence des yeux presque nulle. Ecusson entouré d'un bord très évident. Pattes plus ou moins d'un rouge testacé. Fouet antennaire sans parties rougeâtres.

Type: 1♀, leg. G. Krüger, 3.XII.1924, Bengasi. Paratype: 1♀ de petite dimension, même provenance, 20.XI.1924. .

Je vais résumer maintenant les principaux caractères de la *Hockeria bispinosa* Walk. (4)

♀. — Portion discale des ailes antérieures brune avec deux taches blanchâtres; écaillettes, pattes et antennes brun-noir ou brun-rougeâtre; surface des yeux lisse; scutum peu luisant, parsemé de nombreux points pilifères qui sont éloignés l'un de l'autre à peu près la moitié, parfois moins aussi, de leur diamètre; les interstices parcourus par un réseau de nombreux sillons, bien visible à 50 diam.; écusson largement cordiforme, avec un bord assez apparent, surtout dans la partie apicale qui est presque toujours munie de deux pointes en angle obtus; métanotum pourvu d'aréoles souvent peu régulières; nervure post-marginale vaguement limitée à l'extrémité, à peu près égale au 1/3, parfois presque à la 1/2 de la marginale; dents du peigne des fémurs postérieurs au nombre de 33-34; premier tergite de l'abdomen parfois légèrement coriacé sur ses côtés. Long. 2.5 à 3.5 mm.

♂. — Plus petit, de 1.8 à 2.5 mm., la surface des yeux hérissée de poils; les ailes antérieures sans tache brune ni taches blanches, mais très légèrement teintes de gris jaunâtre, cette couleur souvent un peu plus sombre dans les endroits ou se trouvent les taches brunes des femelles; nervure post-marginale allongée, presque 2/3 de la marginale.

Une variété, que je propose de nommer *nigrescens*, m'a été communiquée par le Dr P. Régnier. L'unique exemplaire reçu, issu d'une chenille de *Laspeyresia leptastriana*, est originaire du Maroc (Djebel Hebri, X.1935). Ses caractéristiques sont les suivantes:

Très noire, tarses brun châtain; tibias postérieurs noirs jusqu'à l'extrémité; taches des ailes plus foncées que celles de la forme typique.

Une espèce voisine, tant de l'*aegyptiaca* que de la *bispinosa* est la *H. testaceitarsis* Cam. (5), dont j'ai vu de nombreux exemplaires des deux sexes récoltés aux Iles Seychelles par Mr. le Dr. H. Scott. Dans la coloration typique de la femelle les antennes, jusqu'au second article du funicule, et les pattes en grande partie, sont d'un testacé rougeâtre, les écaillettes également de cette même couleur, les ailes avec des taches brunes et deux taches blanchâtres comme chez les deux espèces précédentes. Certains individus sont presqu'entièrement de couleur brune et cette teinte prédomine surtout chez les mâles.

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(4) Walker (Er.): Entom. Magazine, II, 1834, p. 13, No. 1, ♀. — Masi (L.): Ann. Mus. Civ. Genova, XLVII, 1916, pp. 104-107 ♀, pp. 107-108 ♂.

(5) Cameron (P.): Trans. Linn. Soc. London, XII, 1907, p. 86. — Masi (L.): Novitates Zoologicae, XXIV, 1917, pp. 132-133.

En outre, les antennes de ces derniers sont toujours brunes-noires, les taches des ailes très pâles. Les yeux de la femelle sont lisses, tandis que chez le mâle on y voit des poils plus ou moins nombreux. Le fouet des antennes est un peu plus allongé que chez les deux autres espèces mentionnées, surpassant la largeur de la tête dans la proportion de 127 : 100 (au lieu de 122 : 100). Le dessus du thorax est presque mat, avec des points pilifères sur le scutum moins éloignés entre eux que leur diamètre ; interstices avec sculpture constituée par un réseau bien marqué, dont les mailles sont aussi larges que longues. L'écusson est cordiforme, avec un bord bien développé comme chez *H. bispinosa*, souvent pourvu de deux pointes obtuses. Chez les deux sexes, la nervure post-marginale n'atteint pas en longueur la moitié de la marginale, souvent elle n'en atteint qu'à peu près le 1/3. Les fémurs postérieurs ont 35 - 36 dents. La femelle de cette espèce est très reconnaissable lorsqu'il ne s'agit pas d'individus à coloration très obscure. Les mâles de la *H. testaceitarsis* se distinguent de ceux de la *bispinosa* par plusieurs caractères : premier tergite abdominal luisant, au lieu d'être densément ponctué et mat ; fouet antennaire moins épaissi ; pubescence des yeux manifestement moins abondante ; tarses testacés ou peu rembrunis ; taches grisâtres des ailes antérieures moins pâles, plus distinctes.

Une espèce bien différente de toutes celles que j'ai étudiées est la *H. afra* mihi (6), dont je ne possède qu'une femelle de Gialo (Cirénaïque) et 3 mâles, provenant de Coufra. Chez cette espèce, le fémur postérieur n'a que 18 dents ; la nervure post-marginale est longue, environ 2/3 de la marginale pour la femelle, tandis que chez les mâles elle est à peu près égale à la marginale ; le bord de l'écusson des exemplaires que j'ai examinés n'est point excavé au bout ; les yeux sont lisses ou presque lisses chez les deux sexes. Les ailes antérieures de la femelle n'ont pas de taches brunes, mais sont seulement légèrement grisâtres dans leur portion discale, avec une tache hyaline au-dessous de la marginale. Tous les tergites de l'abdomen sont luisants aussi bien chez le mâle que chez la femelle. Les écaillettes sont rougeâtres dans les deux sexes. Le scape de la femelle est rougeâtre, le pédicelle légèrement teinté de rouge-rouille, les tarses et l'extrémité des tibias postérieurs d'un rouge testacé.

J'ai particulièrement étudié les sensilles des antennes des femelles chez les quatre espèces *bispinosa*, *aegyptiaca*, *afra* et *testaceitarsis*. Chez la première les sensilles linéaires sont gris, se détachant cependant sur la teinte noire des articles. Chez *Hockeria afra* ils sont également de couleur grise, mais de longueur variable sur le même article et disposés un peu irrégulièrement. Enfin, chez *Hockeria testaceitarsis* les sensilles sont gris, mais plus

(6) Masi (L.) : Ann. Mus. Civ. Genova, LV, 1932, pp. 440 - 442.

atténués que chez *bispinosa* et leur disposition est moins régulière que chez cette espèce. Les sensilles de *Hockeria aegyptiaca* sont un peu moins nombreux que chez l'espèce *bispinosa* et sont de couleur obscure pareille à celle des articles.

Je juge inutile de mentionner ici les principaux caractères des espèces *atra*, *pulchella* et *fulvipes* que j'ai décrites ailleurs (7). *Hockeria atra*, de l'Inde, est bien caractérisée par le dessin de son métanotum ; les deux autres, la première de Formose et la seconde des Seychelles, se reconnaissent à leur coloration.

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(7) Masi (L.) : Contributo alla conoscenza dei Calcididi orientali della sottofamiglia Chalcidinae (Boll. Labor. Entom. Bologna, II, 1929, pp. 180-181, fig. 9, ♀ *H. atra*). — Sauter's Formosa Ausbeute, Chalcididae (Konowia, XI, 1932, pp. 38-40, ♀ *H. pulchella*). — Chalcididae of the Seychelles Islands (Novitates Zoologicae, XXIV, 1917, pp. 130-132, ♀ et ♂, fig. 8, *H. fulvipes*).

Recent advances in the Control of the Pink Boll-worm (*Platyedra gossypiella*, Saunders) by Natural Enemies

(with 2 Charts and 10 Plates)

by Dr. M. Kamal, B.A., M.Sc., Ph.D.

RESUME :

Since the Pink Boll-worm causes severe damages amounting to millions of pounds sterling annually to the cotton production in Egypt, it was deemed necessary to try the biological method of control as an auxiliary to the chemical one.

Attempts are being made to control the pest in two ways, first as eggs and secondly in the larval stages whether they are still active in the green bolls or already have gone into hybernation or rest.

In recent years extensive investigations have been carried out to determine the effectiveness of native parasites, augment their sphere of action and to conduct researches on the usefulness of newly introduced parasites.

As these researches are still in progress any premature statements regarding the future value of such complicated proposition would be misleading, however, some definite results towards the reduction of the Pink Boll-worm population have been attained.

It would be necessary to know far more about the habits and host relationship of the various natural enemies before we are in a position to make forecasts.

The majority of the enemies are larval parasites delatoriously appearing after the pest has reached its maximum population. Highest percentage of parasitism is obtained during November to February when almost no cotton remains standing in the field.

There are still promising opportunities in the introduction of foreign parasites with multiple hosts, over which they can continue to carry over their activities in countries with definite close season and conditions similar to ours.

Introduction.

The present paper is a brief account of research work conducted at the

Parasite Laboratory on the Pink Boll-worm natural enemies by the writer in close association with and under the direction of Dr. H. Priesner, Chief of the Entomological Section of the Ministry of Agriculture.

During the course of investigations in developing means to combat the most injurious cotton pests by reducing their ravages to profitable production, the biological method has evolved in the last six years with special emphasis on the Pink Boll-worm.

As the insect has become almost a common pest in the cotton belts of the world it is hoped that the attempted methods for its control in Egypt would stimulate international interest, establish closer relationships and found more progressive cooperation between fellow entomologists in various parts of the world for the mutual exchange of beneficial insects and the promotion of scientific knowledge.

I most sincerely hope that the results of such pioneer work in Egypt would encourage enthusiasm among members of the various entomological institutions carrying similar researches for the dessimination of first hand knowledge of our insect friends and enemies.

The Situation of Egypt.

Egypt, with its naturally advantageous situation at the cross roads of all nations and with the highly developed system of transportation by sea and air, can play an important role in relaying insect material from far and near thus linking distant countries and making this exchange safer and faster.

On the other hand, this unique situation has also had its disadvantages to the country through the introduction of most of our worst insect enemies such as the cotton pests, mealy bugs and scale insects. These foreign intruders found suitable conditions in the Nile Valley which is noted for its favourable and almost seasonally equable climate. As the cultivable part of Egypt can be likened from a zoo-geographical view point to an island, due to the barriers of deserts and sea, an introduced insect, therefore such as the Pink Boll-worm is obliged to confine its activities in the valley proper and is liable to cause heavy depredations to the crop it attacks starting from the port of entry and spreading southwards with the prevailing north winds.

The Importance of Cotton to Egypt.

The prosperity of the Egyptian farmer and the integrity of the whole country, including the government revenues have depended almost entirely on this great monoculture since its introduction in Egypt about the middle of the nineteenth century.

A failure in the crop, therefore, due to insect attacks or to some financial depression causes serious consequences to the general welfare of the country.

The Major Cotton Pests.

The principal insects attacking cotton in Egypt are the boll-worms and the leaf-worms. Green bolls are damaged by the Pink Boll-worm (*Platyedra gossypiella*) which devours the seeds thus injuring a part of the boll in one or more locules, while the Spiny Boll-worm (*Earias insulana*) possessing similar boring habits destroys completely all the locules of the boll and making the cotton unpickable (see Plate II, Figs. 7 and 8).

Before the advent of *Platyedra*, the *Earias* was the most dangerous enemy to the cotton culture. But since this worm is known to breed the year around without decided overwintering forms, the campaign staged to control the Pink Boll-worm, particularly, the ordinance which establishes a decided close season and regulates the uprooting of cotton sticks and other malvaceous plants standing in the field, thus providing a lack of food supply in winter has resulted in subduing the *Earias* and rendering it to an insect secondary in importance to the Pink Boll-worm.

Potentialities of Platyedra gossypiella.

The Pink Boll-worm which is our major pest of prime significance begins its attack in the field as early as June (see Chart I, and Plate II, Figs. 1-6) with an average loss of 5 % and progressing thereon reaching 20 % in August and rising rapidly with the increased supply of bolls until it reaches 50 and 60 % in September, after which almost every boll is attacked (see Chart I).

This continuous increase in the percentage of bolls attacked could be explained on the basis of the availability of large amounts of food supply, the potential capacity of the pest for reproduction and the absence of relatively competent natural enemies.

To sum up the accumulated data we have at hand, one is able to deduce that the maximum rate of reproduction of the Pink Boll-worm is reached during September and October and falls to a minimum during June and July (see Chart I).

Although the population of the boll-worms dwindles in May and June to the insignificant percentage of five or even less, yet the potentialities of the pest are so great that the few individual larvae scattered here and there hibernating in the seeds of dried bolls are able to produce an infestation in the cotton fields as early as the first week of July equivalent to 10 % attack.

It has been reported that a female *Platyedra* moth can lay an average number of eggs varying from 250-300 but, in confinement, I have not been able to raise on the average more than 50 eggs during the life of the moth.

This inevitably indicates the seriousness of the pest we are dealing with. Its peculiar habits justify the combination of all methods and the cooperation of efforts for its control.

Since Egypt suffers an annual loss of nearly two million kantars of cotton due to the ravages of this single pest, equivalent in these days of low prices to at least six million pounds sterling, any expenditure on researches pertaining to the devising of methods for the control of this pest would be extremely justifiable.

Population of the Pink Boll-Worm.

The Pink Boll-worm is an exotic pest first discovered in Egypt about the year 1912. It has since multiplied itself in large numbers and spread all over the Nile Valley. Its population in the field, as already stated, reaches its maximum during September, October and the first half of November. Then it begins to drop down suddenly due to lack of food and the advent of cold weather.

This question of food supply has a direct bearing on its status in the field and affects simultaneously the efficiency of its natural enemies, as will be explained later.

However, it is interesting to note that the total annual percentage of damage shows no significant change, therefore, it can be justifiably identified from a biological control standpoint that its population has become stabilized.

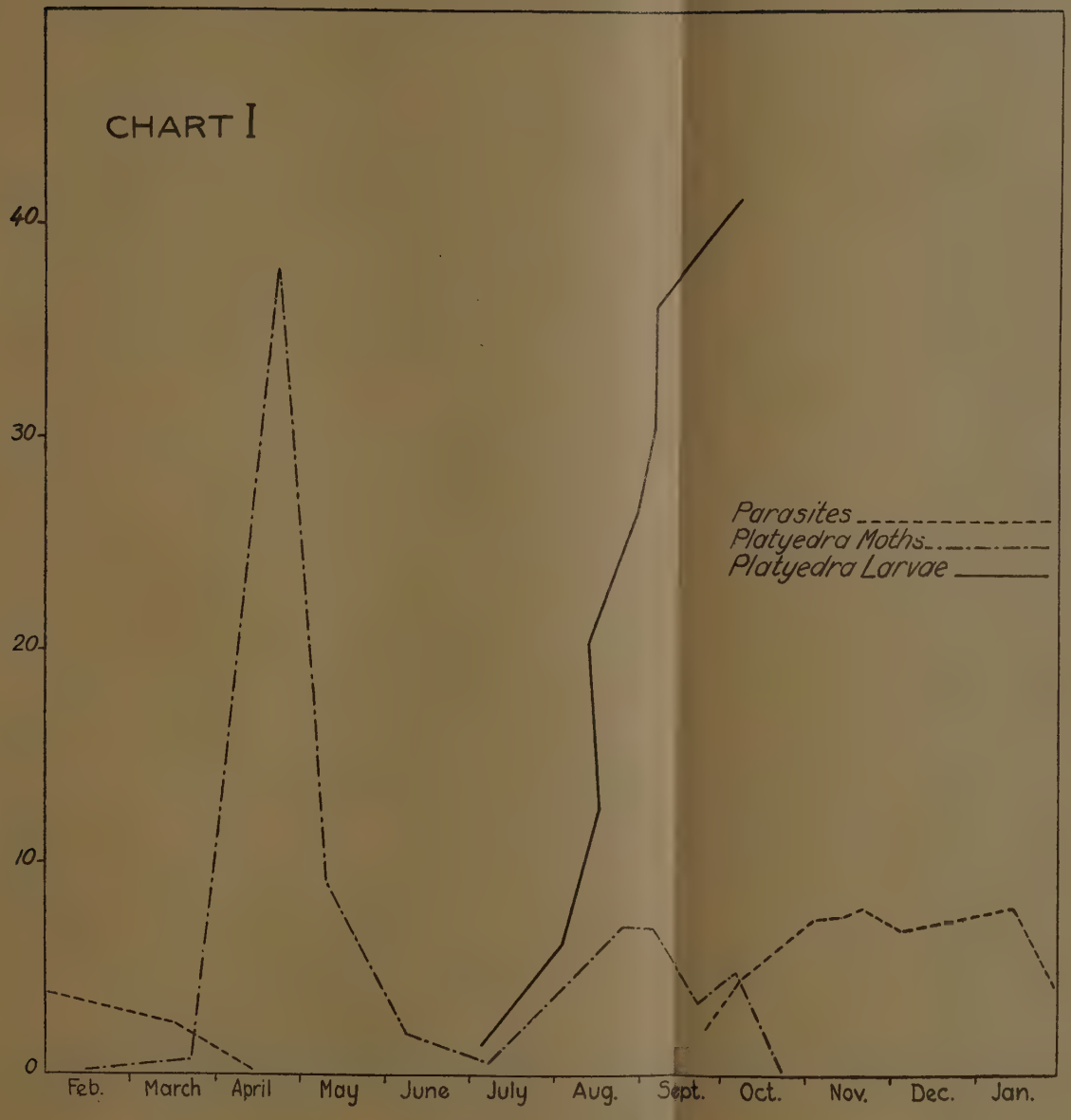
If we attempt to calculate approximately the number of boll-worms present in one acre of cotton during the period when the infestation has just begun until it reaches its maximum, we come to very fascinating results as seen from the following illustration.

During the first part of August when the average percentage of infestation in the fields amounts to fifteen, the total population of larvae per acre fluctuates approximately around 114,000; during September 406,000; in October 1,216,000 and in November it drops down to 76,000.

Relationship of Host Population to Parasites.

It is evident, therefore, that in order to control a moderate infestation by this pest over an area of considerable size, amounting to close to two million acres of cotton which are annually grown in Egypt, through direct use of parasites, it will be essential to liberate a proportional number of parasites in order to produce any measurable effect, particularly if the parasite we are dealing with is a new addition to the territory and has not been completely established.

This implies to the newly introduced parasite from Kenya Colony, *Microbacon kirkpatricki*, which we have been breeding continuously in the laboratory in large numbers and releasing it in certain localities early in the season when the host population is beginning to rise, hoping by this plan to be able to accelerate control through early liberation.



Field Emergence
of Pink Bollworm and Parasites.

This *Microbracon* reproduces itself more rapidly than its host because it breeds throughout the year in a succession of short cycle generation. At the peak of activities of the parasite and its host the former is able to produce three generations to every one of the latter.

Laboratory experiments as well indicate that the rate of oviposition between host and parasite is fairly comparable, but on application in the field the whole balance is upset and is shifted in favour of the host, while the parasite appears to be of no great economic value.

Explanation of this upsetting of laboratory principles can be sought in a precise analysis of the biotic factors of the environment. It is reported that this parasite has no definite overwintering period in its native habitat, while in its new territory there is a decided wintering of the host, and more over the latter possesses a distinct resting stage passed in what is termed double seeds (see Plate III, Fig. 3) varying in length from a few months to over one year.

Aside from the climatic factors, the possibilities of biological control of such a formidable pest is governed by its peculiar habits. Even under most favourable conditions natural enemies find difficulty in reaching to the larvae which are protected in the recesses of the green bolls by the thick walls of the carpels which in most cases do not bear any outside signs of infestation. While in open dry bolls the pest is hidden inside the cavities of twin seeds woven tightly together by a secretion of strong white silk.

It is not unlikely that a large number of parasites *expire from exhaustive search* for the host which in its turn is a strong fighter, and in trying to evade its enemy it uses the strong mandibles indiscriminately with the result that many parasites succumb in the struggle.

There is almost a concensus of opinion among entomologists that Egypt would seem to be particularly adapted to biological control work comparing it in this respect with the Hawaiian Islands. This principle has been found to hold true only with some pests.

With cotton insects, however, several important and inter-related factors have to be taken into consideration before any generalized statement can be issued.

Since the majority of the natural enemies subside almost entirely on the resting or hybernating larvae wherever it is found, the fate of these parasites depends on the process employed in suppressing the wintering stage.

The laws that regulate the close season, the treatment of the seed before it leaves the ginneries and the destruction of refuse bolls on the sticks or falling on the soil have undoubtedly their direct effect on the efficacy of natural enemies.

In other words, the mechanical method and the biological are opposed to each other and the former has to be developed at the detriment of the latter.

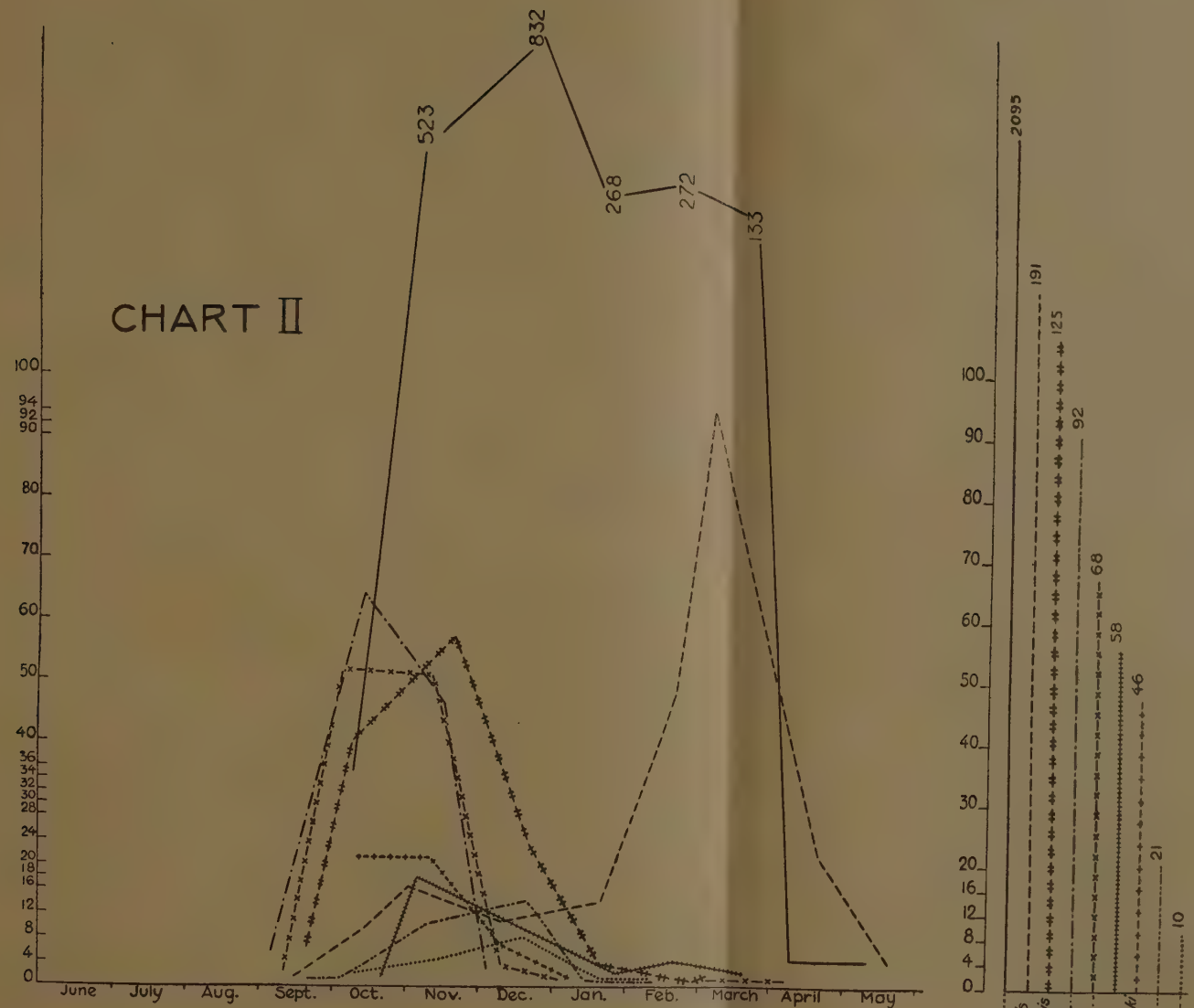
Consequently, it could be said generally speaking that natural enemies would stand a much better chance to do effective work if cotton or related alternate host plants were allowed to remain in the field. It is agreed that should natural control be used, it must be given a full swing to show its merits.

This phase of the subject, however, was not neglected in our program of work. Localities with variable climatic conditions and distances apart were chosen in Lower and Middle Egypt. In each locality an area of two acres was allowed to remain after the cotton was picked. The experiment was repeated for four consecutive years.

Through this process, parasites were allowed to breed the year around on the larvae remaining in the capsules on the plants. Periodical gathering and dissecting of the bolls had been carried out, but the results obtained were not encouraging to the extent of supporting such project as the ratooning of cotton.

Although this does not give a final solution to the problem, it throws some light on the factors involved. It has been noticed that the larvae in the bolls became scarce in May and June and the few surviving ones were too weak to serve as attractive hosts for the continuous activities of the parasites (see Chart II). Laboratory tests prove conclusively that larvae extracted from dry bolls as well from double seeds late in the season do not excite the female parasites to stimulate the ovipositing of the regular egg supply to the extent that the fresh larvae do. The latter have been noticed to accelerate that instinct, particularly in the *Microbracons* that when a female begins laying the rest follow her example. Moreover, natural mortality due to adverse climatic factors and the effect of the predatious mite *Pediculoides ventricosus*, is very high among the surviving Pink Boll-worm larvae. As a consequence, the population of the remaining ones decline to an insignificant figure as already been stated, thus directly affecting the integrity of their natural enemies.

This cumulative effect for several successive years evidently reduces the efficacy of the parasites. Such fluctuations in the preponderance of the pest have left a decided effect on the newly introduced parasites which are left without a fresh supply of hosts from December till July. During this period of leanness, which form greater part of the year, we depend for our constant breeding operations on the supply of larvae extracted from double seeds which we secure from the untreated refuse of the ginneries. Being rather susceptible to a high percentage of attack by *Pediculoides* mites in the spring, the seeds are stored away in refrigerators for our daily use. In this way we can ensure the carrying over of our stock of parasites during the winter, when no cotton is to be found.



Relative Seasonal Abundance
of the Various Parasites of the Pink Bollworm (*Platyedra gossypiella*)

Figures indicate approximate numbers proportionally corresponding to the actual tendencies of the population of the different parasite species during the years 1929-1935 inclusive.

Activities of the Natural enemies.

In Egypt as in other cotton growing countries, the Pink Boll-worm is attacked by several species of parasites and predators. Most prominent among the parasites are the Braconids, the Ichneumonids, the Chalcids, and the Bethylids which collectively constitute the parasites of principal importance.

While, such predators as the Coccinellids, Chrysopids, *Triphleps*, Staphylinids, Carabids, and Arachnids play but a minor role in the process of natural control.

The majority of the parasites known in Egypt are larval feeders only appearing at the end of the cotton season from October to February, i.e., when the reproductive potential of the host has reached its maximum and the population is declining. One can easily see from Chart II that the highest percentage of parasitism is obtained during November to February when over 50 % of the hybernating larvae in the bolls are killed, about 15 % of which is due to parasites.

This tardy appearance of the parasites as well as the relatively low percent of attack can be explained by the comparative inefficacy of the prevailing parasites resulting as an effect to the long period of the close season which interferes with the continued multiplication and development of those natural enemies.

Parasites recovering from that long shock are not given the full opportunity to reproduce up to their maximum capacity because as they begin to do so their hosts have already decreased in number and started to hybernate or rest concealed in situations well protected from attack. Since also there is a great number of host individuals destroyed through agricultural and mechanical processes, following the harvesting of the crop, it is evident that the natural enemies will be affected in a like manner.

Consequently parasites appearing during the period in which the host is at its lowest numbers (April, May and June) have little or no chance to survive through the rest of the summer until the host becomes prevalent.

As the objective of biological control « is to establish a change in the numerical ratio of the reproducing populations of the pest and its enemies with a predominance in favor of the latter », it could be easily seen under the light of the previously mentioned facts that the possibilities of applying such method in the control of the Pink Boll-worm is enterspersed with many factors which make the project much more difficult than it would really appear to a casual worker.

Methods of Biological Control.

The biological method of control employed against cotton pests in Egypt comprises the use of indigenous enemies as well as the introduction of new

species. Our plan envolves liberation, as soon as an appreciable amount of boll infestation starts in the field, the continuous release of large numbers of parasites at certain localities to parallel with the increase in the degree of insect infestation and the extention of that principle of control to hybernating larvae.

In other words, our objective is to try to check the increase of the Pink Boll-worm when it is active in the field by forcing its natural enemies early in the season through the process of artificial breeding and also by augmenting the action of parasitism throughout the winter to produce reduction of the population of the overwintering larvae.

A. — Indigenous Parasites

The intensification of the work of natural enemies already established in a country has not been looked upon with favor by many workers.

The recapitulation of this principle of assistance for three successive years in Egypt has emphasized the fact that such extension does not justify the time and money expended on it. The little success which had been attained did not create any permanent adjustement between host and parasite for any length of time. The former resumed its usual status directly after the field infestation had begun, although higher parasitism was noticed among the overwintering host larvae.

In some cases this artificial assistance had some advantage in bringing the parasites earlier for next season in the field than would otherwise have happened if left unaided and the result of this early emergence produced a higher kill among the host.

It remains to be settled yet whether this will always hold true if the experiment is carried on for several successive years.

The two native parasites that were adapted to such work were *Pimpla roborator* and *Microbracon brevicornis* (see Plate VII, Figs 1 and 2) which both respond easily to laboratory breeding processes.

The former with its long ovipositor can reach to the host in far distant situations whether hidden inside green bolls or in double seeds of damaged bolls remaining on the sticks.

The latter, however, cannot compete with the former in its activities. Its attacks are confined to the larvae in open bolls or anywhere it is found exposed. It is not uncommon to find it doing good work early in the season (July) in Middle Egypt killing a good many of the larvae found astray in cotton flowers, buds or squares.

The combined activities of these two parasites which dominate all other forms over the wintering larvae of the Pink Boll-worm have a considerable effect in the reduction of the population of this pest.

Since they are both established over the large area where the host prevails, they are considered very valuable as natural agents for biological control.

There are other less important but quite effective parasite species which take part in the control of the pest. Such parasites as *Elasmus platyedrae*, *Habrocytus* sp., *Dibrachys* sp., and the Eulophid *Pleurotropis* sp. have their value as important auxiliaries in the biological control (see Chart II). In the spring and early summer these parasites compute an important factor in controlling the pest along its hybernating range during which seasons other parasites such as the important *Pimpla* have already disappeared. Dry hot weather has a decided lethal effect on the population of the latter parasite and for this reason it protects itself by going into aestivation. In January, February and March, the *Pimpla* becomes very common along its feeding range and is seen flying about on the stacks of cotton sticks ovipositing here and there in dried cotton bolls.

Other parasites including *Chelonella sulcata*, *Apanteles* sp., *Chalcis* sp. (*Brachymeria*), *Limnarium interruptum*, *Phanerotoma hendicasiella*, emerge from the cotton bolls in large numbers especially in our northern cotton belt, i.e., areas close to the sea. The status concerning the host relationship of these last parasites has not been definitely established and it is likely that the majority are parasites of the Spihy Boll-worm (*Earias insulana*).

B. — Introduced Parasites

From the preceding discussions, it is essential in order to complete the cycle of natural control of the Pink Boll-worm, to make a special study of the natural enemies of the pest in its habitat and try to introduce into Egypt as many efficient beneficial enemies as possible.

Central and East Africa (Uganda, Nyassaland, Kenya and Congo), India, the East Indies, Manchuria, and Corea have been investigated for parasites and valuable information has been accumulated for future use. The Fiji Islands seem to present a very promising opportunity for the importation of valuable parasites attacking the larvae and pupae. Through the courtesy of Mr. Simonds, arrangements have been made to ship these parasites to Egypt as soon as better transportation facilities are available. The air service lately inaugurated between Cairo and Australia has helped to bring the two countries closer together, by reducing the journey to less than one-third the time it used to take. Also the government entomologist at Lyallpur, Punjab, India, has been kind enough to cooperate with us by sending shipments of the Braconid *Microbracon lefroyi*, which is common on the Spiny Boll-worm in India and which is found to work successfully on the Pink Boll-worm in Egypt.

With the regular air transportation facilities between our respective countries it was made possible to introduce parasite material in excellent condition in a period of less than five days.

Attempts were formerly made by the Royal Agricultural Society in 1912 to import this species of parasite into Egypt. Notwithstanding the difficulties encountered by the delegate, Mr. A. Alfieri, and the efforts exerted in keeping the parasite alive en route, the shipment suffered immensily from the long journey and none was available to release in the field.

The discovery of the importance of *Microbracon kirkpatricki* (Plate VIII, Figs 1 and 2) in Kenya Colony in 1926 (1) aroused interest in importing this parasite into Egypt in the hope of establishing a certain percentage of parasitism among the larvae in the green bolls. Alfieri (2) again in 1927 was sent for a mission to Kenya which culminated in successful introduction of the parasite. It is reported by Kirkpatrick that the percentage of parasitized larvae in Kenya increases enormously by February and that an 80 % parasitism is not an uncommon occurrence.

In Egypt the parasite has proved to be capable of destroying the Pink Boll-worm larvae in green bolls whether sound or perforated by exit holes. It was also possible to recover it from bolls collected from the field up until nearly the end of April, after which one could not predict the outcome of the liberations as no further record of its occurence is even known.

Regardless of the efforts of five years of work on this species, we could not get it to adapt itself in the Country nor to have it effect an appreciable degree of control on its host. The large number of individuals amounting to over fifty thousand released every year in one particular locality do not seem to exercise any material influence on the numerical ratio of the Pink Boll-worm. For this reason it was found highly desirable that liberation sites should be changed every two or three years with the object of trying different ecological nitches near the coast and in the interior, for the purpose of establishing this parasite which is known to breed the year over in its native home.

Whether this species can finally adapt itself to live under Egyptian conditions where the host possesses a definite resting stage, and where cotton together with other related plants disappear from the field in winter, is still a matter remaining to be solved.

A question can be raised that the number of individual parasites set out for colonization is comparatively much smaller than the number of host in-

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(1) T. W. Kirkpatrick : Notes on a Braconid Parasite of the Pink Boll-worm (*Platyedra gossypiella*, Saund.) in Kenya Colony. — Bull. of Entom. Research, Vol. XVIII, Sept. 1927, pp. 47-50.

(2) Anastase Alfieri : The introduction of a parasite (*Microbracon kirkpatriki* Wilk.) of the Pink Boll-Worm into Egypt. — Bull. Soc. Roy. Entom. Egypte, Vol. XII, 1928 (1929), pp. 52-56.

dividuals present in the field, but on the other hand the parasite possesses a much shorter life cycle (10 days in summer) than that of its host (over 30 days). It would be evident, therefore, under favorable conditions that the parasite can reproduce a population increasing in number by multiplication through successive generations until a definite ratio is reached, but this has not been the case and the parasite has never committed itself to breed up to its maximum capacity.

Such unsettled condition regarding the status of the Kenya parasite necessitates from us annual liberation of the species with the hope of getting it finally added to the established list of beneficial insects.

It may be true that the adverse weather conditions in its new home, which are markedly different from those in Kenya, have interfered in the permanent establishment of the parasite.

Summers are generally known to be hot and dry in Egypt and winters are cold enough to force the boll-larvae into hybernation but only compel the parasite to slow down its activities as it has been found breeding on the larvae in dried bolls up till the end of April. Also the difference between day and night temperatures sometimes is great particularly in the inland provinces and occasionally in certain seasons the night temperature drops down one or two degrees below freezing.

With such meteorological features we can hardly, therefore, expect that all the imported parasites will take hold in the country, but if we succeed in getting a few effective ones acclimatised they will be of great value in contributing to the reduction of the population of the boll-worms.

The enthusiasm that has been attached to the *Trichogramma* in recent years has lead us to adopt this new idea for trial control of the Pink Boll-worm. Since *Trichogramma evanescens* is found in Egypt in large numbers attacking the eggs of the Sugar-cane Borer, *Chilo simplex*, and known also to parasitise the eggs of the Spiny Boll-worm, *Earias insulana*, it has occurred to me to try it against the Pink Boll-worm eggs. *Trichogramma minutum* has also been introduced through the kind help of Dr. Thompson of Farnham Royal laboratory for the same purpose.

A special technique for mass production was devised to meet our hot summer conditions which unfortunately limit the liberal use of these tender organisms.

We hoped that through the combined activities of these two parasites we could plan an early campaign and supplement the work of the larval parasites by destroying a quantity of the eggs before they develop to the destructive larval stage.

Trials with the two species of *Trichogramma* have been continued for two successive years and large colonies have been released at two close localities in the Giza Botanical Section farm.

Field liberations began in June and increased in July when egg oviposition became very prevalent to justify this measure of control.

A careful inspection of the field plots was carried out during the period of liberation which lasted till the middle of September with the objective of determining the exact effect of these parasites. The *Platyedra* moths generally lay their eggs scattered singly on the host plant and the hatching young larvae seek their way to the bolls or buds. The effectiveness of the *Trichogramma* has been found to be determined by the abundance of easily accessible eggs and by its power of dispersal which is unfortunately very limited.

Data secured as a result of the trials show conclusively that very little success can be contemplated, yet further exhaustive tests for a much longer period are not undemanded for the final settlement of this question.

Another interesting parasite, *Microbracon mellitor*, was recently introduced from the Hawaiian Islands for the control of the Pink Boll-worm. It breeds very readily on the larvae and has responded immediately to our ordinary practices of quantity production. Great hopes are being placed on this species as it has been found to accept larvae of other Lepidopterous species as hosts. Several thousands have been released in the field which will be greatly increased this season in hopes to get the parasite permanently established.

CONCLUSION.

In concluding this treatise, on the biological control of the Pink Boll-worm, it is always to be remembered that the process is much more complicated than it really appears to be. It envolves several factors closely associated together that a careful consideration of them all should be thought of before any plan could be drawn.

Fundamental researches are still needed to elucidate several important points on the habits and behavior of the various parasites, their host relationship and their exact status in the field when the host population falls to a minimum.

Up till the present time we have not, with our limited individual attempts and means, been able to effect any definite reduction in the curve of field attack of the Pink Boll-worm in localities where efforts were expended to control the pest by direct liberation of parasites in the field and by the use of natural enemies against the overwintering larvae.

It may be out of the question to attempt exercising control by liberating enough natural enemies on an infestation of the Pink Boll-worm in the field thus anticipating to produce a reduction of the pest in its range.

Our faith lies in the application of natural enemies introduced from localities where the Pink Boll-worm is known to exist but causes no significant damages.

The Punjab district of India, which presumably the original home of the Pink Boll-worm in Egypt is a promising territory to be explored for natural enemies due to the fact that the insect occurs there but never been a troublesome pest.

« The methods of biological control have in many cases proved their value, but they are not infallible and there is no reason to suppose that they will ever supplant all other methods of combating insect pests » [Thompson].

ACKNOWLEDGEMENT.

Before closing up, the writer wishes, on behalf of the entomological section of the Egyptian Ministry of Agriculture, to take this opportunity to extend his extreme trankfulness to the many fellow entomologists in foreign lands who have collaborated with us in various ways and who have been kind enough to offer their assistance by forwarding material or information which helped in the promotion of these researches.

To Mr. Clausen of the U.S. Bureau of Entomology and his representatives on the Continent, Drs. H. Parker and L. Smith, we feel especially indebted for their many valuable help which gave a great impetus to biological control in Egypt.

To Prof. H. Smith of the Experiment Station, Riverside, California, and to Dr. Thompson of the Farnham Royal Laboratory, we express our appreciation for their courteous offering of material and knowledge pertaining to parasites.

To the Imperial and Government Entomologists in Africa, India, and the distant sea islands, we express our thanks for their hearty cooperation on the question of biological control.

And last but not least, to the Japanese and Dutch workers in the East Indies, Manchuria, and Corea, we feel much obliged for the valuable information accorded to us and which we hope it will help others to contribute to the success of controlling a great world troublesome pest, that of the Pink Boll-worm.

PLATES

Explanation of Plate I.

A side view of the Parasite Laboratory at Giza :

The houses to the left are used for the breeding of the beetle *Cryptolaemus montrouzieri*. They are ant-proofed by means of cement basins located at the bottom, which are filled with water carrying a film of kerosine.

The building to the right is a part of the laboratory used for the study of insect parasites.

Explanation of Plate II.

In this plate the various stages of the Pink Boll-worm are shown :

Fig. 1. — A collection of moth eggs.

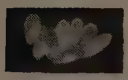
Fig. 2. — An egg highly magnified.

Figs 3 and 4. — Larva of the Pink Boll-worm showing the dorsal and lateral views.

Fig. 5. — The pupal stage of same.

Fig. 6. — The moth.

Figs. 7 and 8. — Show the type of damage to cotton bolls by the Pink Boll-worm.



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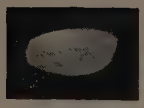

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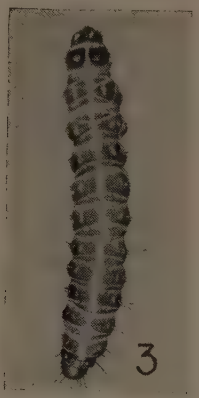

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Explanation of Plate III.

Fig. 1. — Showing one of the methods used in storing the Pink Boll-worm larva for breeding purposes during the time when none is available in the field.

The zinc box with wire gause on top and sides for ventilation contain wire trays on which pads of loose cotton wool are employed to trap the resting larvae.

Fig. 2. — The rolls of corrugated paper at the bottom show another way of preserving the active larvae before they are stored in the ice box.

Fig. 3. — Shows the double seeds which contain resting Pink Boll-worm larvae and which serve as our supply for the larvae during most of the breeding season.

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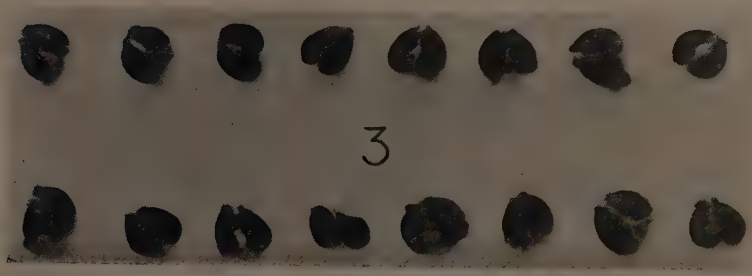
Plate III

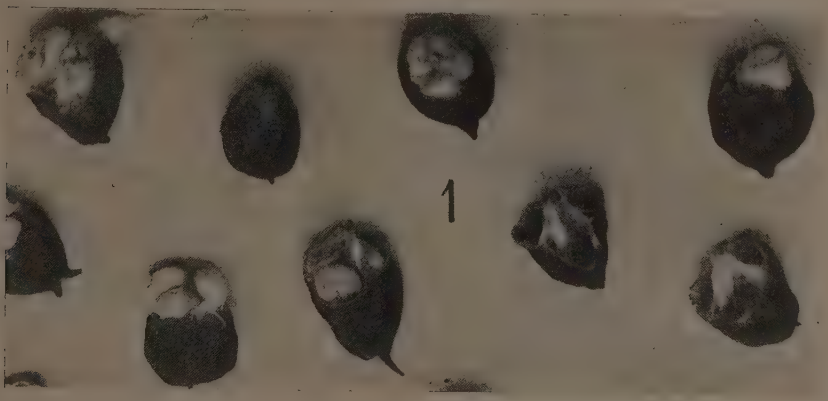


Explanation of Plate IV.

Fig. 1. — This Figure shows empty and closed cotton bolls used in the propagation of parasites, particularly the *Pimpla*. The locules are stopped with corn pith to prevent the larvae from crawling out.

Fig. 2. — Here are illustrated the artificial cocoons made of ordinary cotton wool enclosing Pink Boll-worm larvae. They are useful in the propagation of parasites with short ovipositors such as *Microbracon brevicornis*.

Fig. 3. — Shows a bunch of ordinary barley straw cut into small pieces in which five larvae are placed and closed with corn pith from both ends for the purpose of artificial propagation of the parasites of the Pink Boll-worm such as *Microbracon kirkpatricki*.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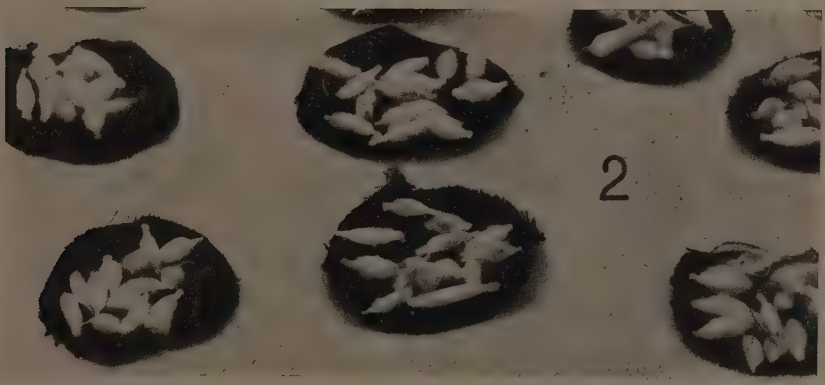
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Explanation of Plate V.

Fig. 1. — Shows a number of the grass chimneys employed in the propagation of the Pink Boll-worm parasites.

Each chimney contains water, sugar, four or five straws, and a few male and female parasites.

Fig. 2. — A cage used in the breeding of the Pink Boll-worm parasites. It has a sliding glass top, an extra wooden sliding top, and a sliding cloth bottom.

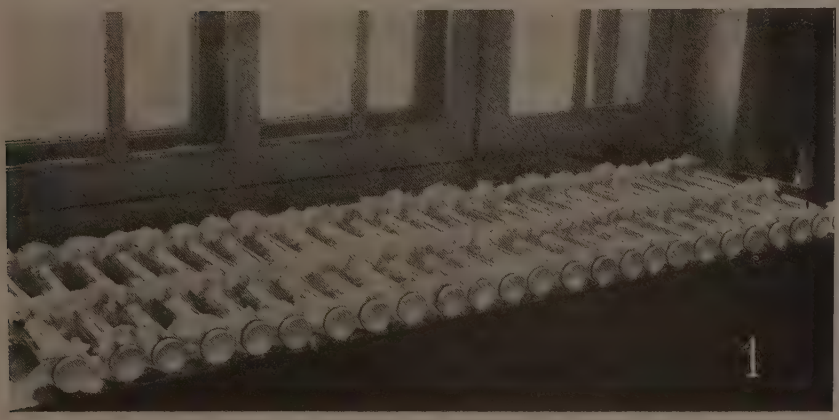
Food and material are introduced from the top.

Parasites are placed from the opening closed by the cork.

The extra wooden top can be used to shut off the light from the top, thus forcing the parasites to be drawn to the bottom in close proximity of their food and host.

To remove material slip the top slide in the bottom grooves, expose to the light, and all parasites go to the top.

Dr. M. Kamal Plate V



Explanation of Plate VI.

Fig. 1. — Shows a cage in which parasitized straws are placed after the removal of the cloggings from the ends, close the top by the two sliding glass and wooden slides, and when the parasite emerge they are collected in the tubes.

Fig. 2. — Shows a trial method of propagating the parasites on double seeds or dry cotton bolls containing artificial cocoons.

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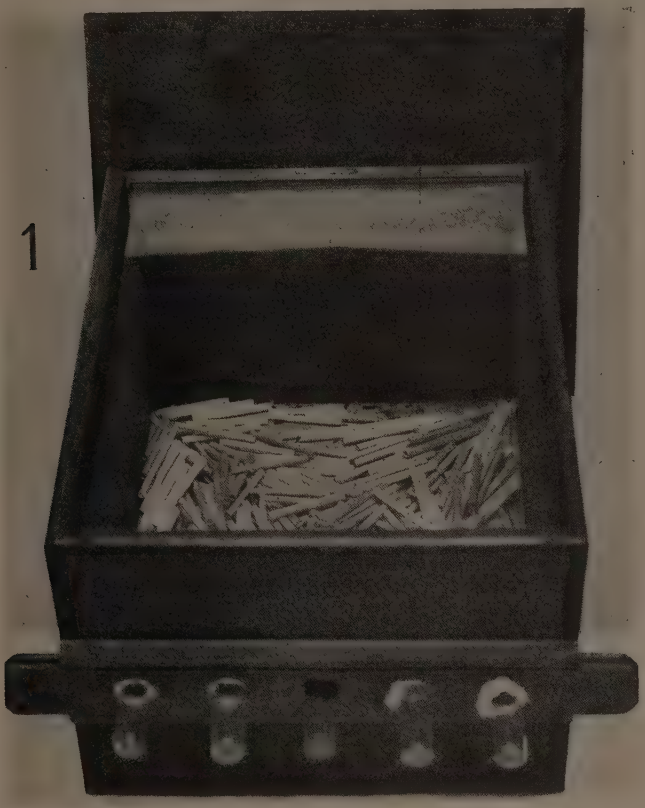

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Explanation of Plate VII.

Fig. 1. — Shows the female parasite *Pimpla roborator*.

Fig. 2. — Shows the female parasite *Microbracon brevicornis*.

1

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Explanation of Plate VIII.

Fig. 1. — Shows the female parasite *Microbracon kirkpatricki*.

Fig. 2. — Young *Microbracon kirkpatricki* larvae feeding on their host larvae, the Pink Boll-worm.

1

2

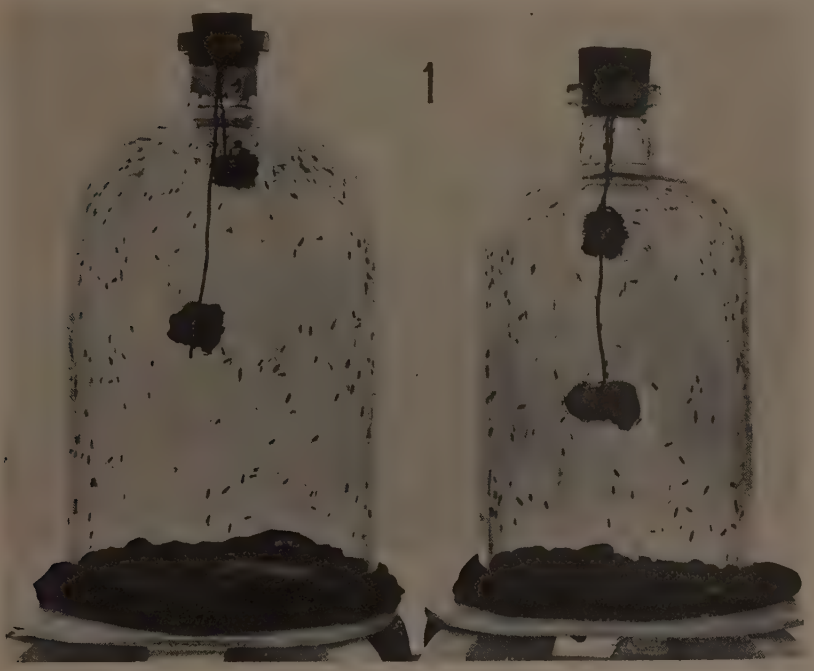
Explanation of Plate IX.

Fig. 1. — Bell-jars containing a large number of parasites to be fed and mated before liberation.

Balls of cotton wool soaked in water together with cubes of sugar are seen on the wire hooks.

Sugar blocks are also supplied on the bottom of the jars.

Fig. 2. — A cloth cage in which mated parasites are placed to feed until ready to be collected and released.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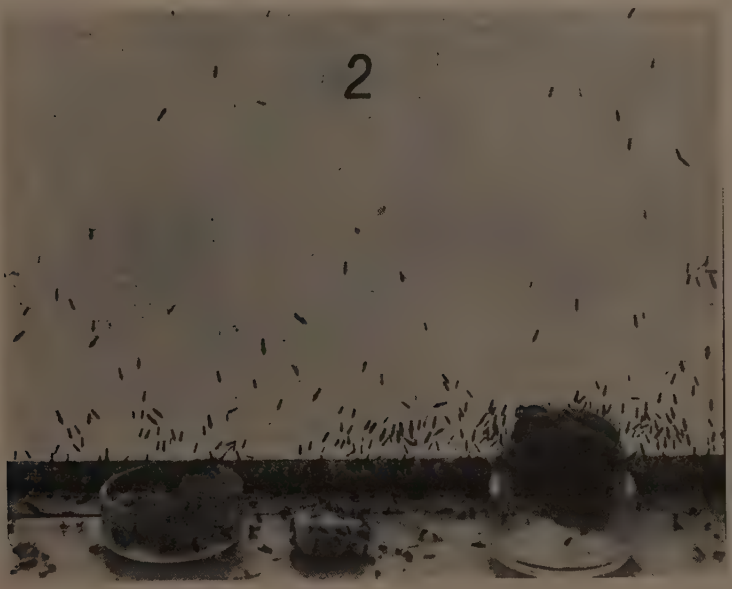
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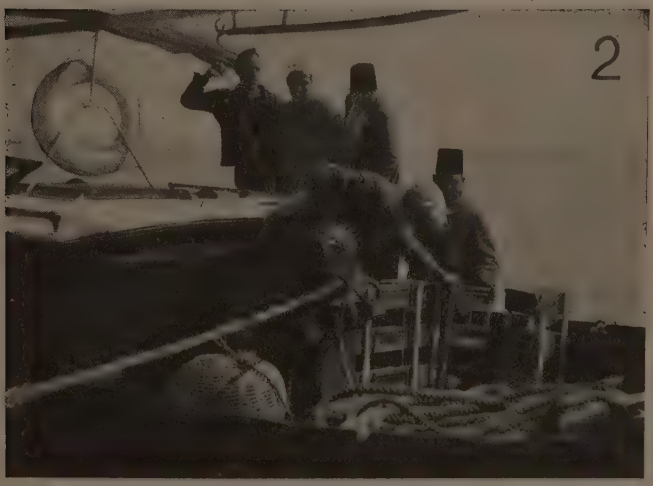
Explanation of Plate X.

Fig. 1. — Showing how parasites are released in cotton fields to fight the Pink Boll-worm.

Fig. 2. — A shipment of parasites arriving from Kenya Colony being removed to shore at Suez. The cages contain green bolls collected from the field and attacked by the Pink Boll-worm on which the parasite *Microbracon kirkpatricki* is breeding.

Dr. M. Kamal

Plate X



Séance du 16 Décembre 1936

Présidence de Monsieur H. C. Efflatoun Bey, *Vice-Président.*

Tetralonia cuniculina Klug and allied species

(Hymenoptera-Apoidea)

by J. D. Alfken, Bremen.

A lot of bees from Egypt which my friend, Professor Dr. H. Priesner was kind enough to send me for examination, contained several species of *Tetralonia* which make it possible to recognise the two species of *Eucera* which the excellent author Klug described in 1845 as *E. cuniculina* and *pumila*.

In my paper « Beitrag zur Kenntnis der Bienenfauna von Aegypten », Senckenbergiana, v. 8, p. 100, 1926, I wrote that *E. cuniculina* and *E. pumila* were the same species, for at that time I followed Friese. At present, after having seen specimens, sent to me by Priesner, I must confess that this opinion is not correct. *E. cuniculina* and *E. pumila* are two different species. According to the descriptions, Klug separates the species already according to the size and further, as follows: *E. cuniculina:* « Antennae fuscae, subtus articulo primo secundoque exceptis, rufo-testaceae » and *E. pumila:* « Antennae .... nigrae ». These characters are indeed sufficient to distinguish the two species. In order to be quite sure I asked Professor Bischoff of the Berlin Zoological Museum to examine the types (of each only one ♂ exists) once more. He did so. The result is:

E. cuniculina.	*E. pumila.*
Antennae red beneath, red-brown above.	Antennae red-brown beneath, black-brown above.
Clypeus black with a large triangular yellow spot.	Clypeus yellow, only at the sides above notched with black.
Mandibles black.	Mandibles with a yellow spot at the base.
Hair of thorax more yellowish-brown above.	Hair of thorax whitish above.

E. cunicularia Friese, Bienen Eur., v. 2, p. 58, 1896, is identical with *E. pumila* Klg. for Friese notes: « Clypeus gelbweisz, Mandibeln schwarz, mit dreieckigem, weiszem Fleck. Fühler schwarz, unten rotbraun ». The name « *cunicularia* » is a mistake of Friese. — Klug never described an *E. cunicularia*, he named his species *cuniculina*.

In my paper on *T. cuniculina* Klg. and *T. biskrensis* m., Deuts. Ent. Ztschr., pp. 68-70, 1933, the description of the ♀ suits to *E. cuniculina* Klug and in the table too; but the ♂ in the latter is *E. pumila* Klg.

Dusmet described, Mem. R. soc. Espan. hist. nat., v. 13, p. 194, 1926 (♀ from Spain) and « Eos », Rev. Espan. Ent., v. 4, p. 279, 1928 (♀ and ♂ from Morocco) a new species of *Tetralonia* which he named *quilisi*, the ♀ of which he thought to be related to *T. mastrucata* F. Mor. The males have the clypeus either totally black or with a yellow spot; these certainly belong to *T. cuniculina* Klg. According to the description of the ♀ I also cannot find any difference between *T. quilisi* and *T. cuniculina*; therefore I suppose these two species to be identical. — Dusmet did not examine the types of *E. cuniculina* and *E. pumila*; he therefore was not able to recognise the species which he possessed of the *T. cuniculina*-group. He writes that the Spanish specimens of his *T. quilisi* are longer than those from Morocco; it may be possible that these belong to an other species.

In the following I shall try to discuss the species, belonging to the group of *T. cuniculina*, known to me from Egypt and other parts of North-Africa. But, as I suppose, there exist still other undescribed species of this group in that region for I possess some which do not agree perfectly with those treated below.

♀.

1. Smaller; 9-10,5 mm. long. Labrum more or less yellow. Apical margin of clypeus brown-red. Tergum 2 densely covered with grey hairs on the whole surface 2

— Larger; 11-12 mm. long. Labrum black. Apical margin of clypeus brown-red only at the sides. Tergum 2 with dense grey hairs only at the base and the apex, nearly naked in the centre. Flagellum of antennae from article 3 to the apex brown-red beneath, black-brown above. Hind margin of tergum 1-3 indistinctly and more narrowly yellowish coloured. Patch in the middle of the apical margin of tergum 5 pale yellowish-red, in the middle a little elongated towards the base. Egypt .... *T. pumila* Klg.

2. Labrum yellow, elongated to a red-brown point. Flagellum of antennae from joint 3 to the apex dark red beneath, brown above, last joints

paler. Hind margin of tergum 1-3 as in *T. pumila*. Patch in the middle of the apical margin of tergum 5 dark yellow-red, in the middle somewhat elongated towards the base. Egypt, Morocco *T. cuniculina* Klg.

— Labrum brown at the base, yellow at the apex or yellow with a brown macula in the middle of the base. Flagellum of antennae light red beneath, scarcely darker above. Hind margin of tergum 1-3 distinctly and broadly yellow-red coloured. Patch in the middle of the apical margin of tergum 5 pale yellowish-red, equally broad, not elongated towards the base. Egypt, Algeria ..... *T. biskrensis* Alfk.

♂.

1. Smaller; 8,5-10 mm. long. Mandibles black 2

— Larger; 10,5-11 mm. long. Base of mandibles with a more or less large yellow spot. Clypeus nearly quite yellow. Flagellum of antennae from joint 3 to the apex brown-red beneath, black-brown above, punctuation not visible on account of the thick white hairs. Fasciae of tergum 2-4 distinct ..... *T. pumila* Klg.

2. Clypeus black or with a large triangular spot, rather coarsely punctured and feebly keeled in the centre. Flagellum of antennae from article 3 to the apex dark red beneath and above, sometimes a little darker above. Fasciae of tergum 2-4 rather distinct. 9,5-10 mm. long..... ..... *T. cuniculina* Klg.

— Clypeus nearly quite yellow, only above at the sides shallowly spotted with black. Flagellum of antennae from article 3 to the apex light-red beneath, only a little darker above. Clypeus very shining, sparingly punctured, not keeled in the centre. Tergum 2-4 with grey hairs on the whole surface, fasciae indistinct. 8,5-9,5 mm. long..... ..... *T. biskrensis* Alfk.

Ueber *Helenaëa Torre-Tassoi* Schatzm.-Koch

(Coleoptera-Carabidae)

von C. Koch,

Museo entomologico « Pietro Rossi », Duino.

Da aus der, der Originalbeschreibung (1) dieser Art beigegebenen Abbildung der Einschnitt der Vorderschienen nicht ersichtlich ist, habe ich versucht, eine Vorderschiene des einzigen bisher bekannten Exemplars unter dem Binokular zu zeichnen und ist diese Zeichnung nebenstehend reproduziert.

Vordertibie von

Helenaëa Torre-Tassoi Schatzm.-Koch,

den Einschnitt

am Innenrand zeigend.

Es war uns leider nicht möglich, obwohl von unserem Institut aus ein Jahr nach der Entdeckung dieses höchst auffallenden Carabiden eine eigene Expedition an denselben Fundort (Schwefelquellen bei Tor) entsandt wurde, weiteres Material zu finden. Des halb konnte die geplante, mikroskopische Untersuchung bis jetzt nicht durchgeführt werden.

(1) Boll. Soc. Adriatica Sc. Nat. Trieste, Vol. XXXIII, 1934, pp. 21-23.

Studies on the Biology of *Chilocorus bipustulatus* (Coleoptera - Coccinellidae) an enemy of the Red Scale *Chrysomphalus aurantii*

(with 2 Text-Figures, 2 Graphs, and 9 Tables)

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1. Introduction. — 2. Technique. — 3. Production of Eggs. — 4. Mortality of Eggs. — 5. Duration of Development. — 6. Mortality of larvae (and pupae). — 7. Duration of imago's life and number of generations. — 8. Preoviposition period. — 9. Food-Quantity. — 10. Field experiments. — 11. Parasites. — 12. Summary.

1. Introduction.

In the orange- and grape-fruit groves of Palestine a lady-bird *Chilocorus bipustulatus* (1), an enemy of the Red Scale *Chrysomphalus aurantii*, is often observed. The beetle may also be found in all its stages and just as often on plants infested with *Aspidiotus hederae* (*Nerium oleander*, *Acacia cyanophylla* and *longifolia*, *Lonicera*, etc.). Though *Chilocorus* is to be found in very considerable numbers sometimes on heavily infested trees, yet it seems to be in no way able to check the increase of *Chrysomphalus aurantii* sufficiently for the practical needs of citrus culture. In 1930 Bodenheimer wrote in his « Schaedlingsfauna Palaestina's (2) « Von Feinden » — viz. of *Chrysomphalus aurantii* — « ist vor allem *Chilocorus bipustulatus* L. (Coleoptera-Coccinellidae) zu erwaehnen, der ueberall sehr eifrig an *Chrysomphalus* frisst, ohne aber einen bedeutenden epidemiologischen Einfluss zu haben ». Recently also

(1) Drawings of larva, pupa, and beetle may be found in « Bolletino No. 3 of the R. Laboratorio di Entomologia Agraria in Portici from 15.II.1919 [« Il Cercoplaste (o cocciniglia) del fico »] by F. Silvestri. Similar drawings of larva and pupa « after Silvestri » were incorporated by Imms in his « A general Text-book of Entomology (London, 1924) ».

(2) Published by Paul Parey, Berlin, 1930.

Sachs (3) investigated the role of *Chilocorus* as an enemy of *Chrysomphalus aurantii* in a Palestinian citrus-grove (compare Chapter 10). When in 1933 I began work at the Agricultural Experiment Station, Rehoboth, Prof. Bodenheimer suggested to me to undertake an exact study of the life history of *Chilocorus bipustulatus* in Palestine. For this suggestion I wish here once more to express my thanks (4).

If an enemy of a noxious insect is found to be without any practical value under natural conditions, a detailed inquiry into its life-history should be made with a view to establish among other things whether better rearing conditions can be produced in the laboratory than are met with under natural conditions. Then, an answer may be sought to the question whether large numbers of these insects reared in the laboratory can be effectively used in « biological control ». Though these studies may yield only negative results, they are of interest, since they help to establish the causes of the insufficient multiplication of a useful insect as well as any other causes of its inefficacy. Such information is of importance of course for our knowledge of the relations existing between noxious insects and their enemies. An investigation in this direction upon *Chilocorus bipustulatus* is reported in the pages which follow.

To avoid confusion it should be pointed out here, that throughout this work the hibernating beetles and then first, second, third, etc., summer generations are differentiated (see Chapter 7 and in particular the Graphs I and II).

2. Technique.

The numerous individual breedings were carried out in test tubes (e.g. 80 : 10 mm.). But before isolation, the freshly hatched beetles were put together into Petri dishes for some days in order to give them an opportunity to copulate. Since I was not able to find any obvious *sexual differences* in the living beetles, most of the imagos which died in the course of the experiments were dissected. On separating the posterior abdominal parts, the genital organs could be identified at a glance, and the sex was noted in the protocols.

Larvae and imagos were mostly fed with pieces of leaf infested with *Aspidiotus hederae*. In most seasons this Diaspine was found in large numbers upon the plants already mentioned in the introduction. Occasionally, especially in the beginning of the experiments, citrus-leaves infested with *Chrysomphalus aurantii* were given for food. *Chrysomphalus aurantii* but rarely covers the leaves as densely as *Aspidiotus hederae* and it is therefore less fit for use. In well cared for citrus-groves which are protected against noxious insects

(3) Hadar VIII, 17, 1935, p. 197.

(4) My thanks are due to my wife Rose Hecht and to Mr. S. Hestrin, B.A. for their help in rendering the manuscript into English.

nowadays, the infestation is seldom really strong. It may be stronger in autumn-time, but even then it is never as strong as that of *Aspidiotus hederae* on Acacia or sometimes on Oleander. A little piece cut from a leaf of Acacia or Oleander and put into the test-tube is a sumptuous meal for *Chilocorus* larvae or beetles. I took care to see to it that there should always be food in abundance in the test tubes so that optimal conditions for feeding might be ensured.

The various *breedings* were conducted under *different conditions*. Some of them took place in the room, others outdoors standing on one of the laboratory terraces. In these outdoor-breedings the insects were not exposed to temperatures as extreme as those suffered by animals free in the open air, but this condition also deprived them of the opportunity, on the other hand, of active quest for the most favourable micro-climates. Occasionally some of the indoor-breedings were put into a dark box for purposes of comparison with thermostat breedings. In no case did injurious influences upon egg-production, development, or length of life result from the stay in perfect darkness. In the following Tables the terrace breedings are marked O (=outdoor), the room-breedings R, and the dark boxes ones D. Where no substantial differences were observed, the results of O- and R-breedings were frequently united in one single Table.

3. Production of Eggs.
(see Table I).

The eggs are oviform, about 0.9 mm. long, 0.4 mm. broad, ochreous or orange in colour. They are laid singly or in groups of 2-6 (rarely more) on leaf-

Fig. 1. — *Chilocorus* eggs inserted beneath the scales of *Aspidiotus hederae*. The turned scales drawn from lens magnification of 20 diametres.

pieces covered with lice or on filter papers put into the tubes. If the imagos are fed with leaf pieces infested by *Aspidiotus hederae* quite often an egg may be found pushed under a scale (see Fig 1), and sometimes even several eggs under the same scale. But the eggs are not only found under empty scales,

Table I

Egg-Production in Different Generations and Populations.

	Room and Outdoor Breedings.				Thermostat 30°				Thermostat 22°			
	Number of ♀	Eggs produced			Number of ♀	Eggs produced			Number of ♀	Eggs produced		
		Average	Max.	Min.		Average	Max.	Min.		Average	Max.	Min.
1934/35 Hibernated imagos (in spring) ...	25	57.7	122	21 or 7	6	101.5	122	80	9	86.3	156	35 or 17
1935 Summer-generation I.	18	16.5	70	0	11	15.7	35	3	7	57.7	151	20
1935 Summer-generation II.	13 (2	2.8 20	5 —	0 —)	5	2.2	10	0				
1935 Adults gathered in the open air 31.V. and 25.VII.	5	0.6	3	0								
1935 Generation III. ...	9	—	1	0								
1935 Adults gathered in the open air, first half of September.	17	15.2	36	0								
1935 Adults got in the first half of September from larvae gathered in the open air	4	43.2	73	7	Here only egg-production of autumn is considered							
1935 Adults gathered in the open air 11.X...	6	24.7	43	8								
1935 Generation IV ? — Adults received in the midst of October by rearing from eggs of autumnal imagos ...	8	8	24	1								

sometimes they also lie fairly close to the lice-body. No *Chilocorus* eggs were found under scales of *Chrysomphalus aurantii* however, since these scales are more closely pressed to the leaf their ventral scale being stronger.

Let us first consider the production of eggs by the *hibernating* imagos. After moderate egg-production in autumn the females entered a hibernal pause in egg-laying. Some few eggs were still laid in late autumn, sometimes even as late as December (for details see the end of this Chapter).

The spring egg-laying of the R-breedings began in the second half of February. But at that time only a few eggs were laid and by only a few females. General egg-production in all the breedings (indoor and outdoor) dated from the beginning of March, and attained its peak mostly in March and April (5). The egg-laying lasts many weeks or even months. Some instances of the distribution of egg-production in time selected from in all 144 observations are cited in Table II.

The average number of eggs per individual laid by 25 hibernating imagos was 57.7 ; the number varied between 7 and 122.

Some few individuals laid abnormally few eggs, 7 or 8 or 9. These individuals excepted, the minimum egg-production per individual appears to be 21 ; an average of 67.1 eggs per individual was laid by the 21 individuals under observation.

It may be further noted here that individuals marked 106/12.15, and 16 in my protocols (with 43, 57, and 46 eggs respectively) all fall short of individuals 106/4, 6, and 7 (with 63, 62, and 69 eggs each), as far as egg production is concerned ; this even though all insects with the number 106 were of the same origin. This disparity is to be ascribed to the fact that sub-numbers 12. 15, and 16 were bred outdoors whilst the others were bred in the room ; the adults from the outdoor-breedings died in the end of April or in the beginning of May probably as a result of the abnormally long (12 days) « Hamsin » (6) period. Even the stay in the room was only in a relative sense a protection against such climatic influences.

The established *winter-rest in reproduction* is not a strongly fixed character, but an *effect of low temperatures*. Towards the end of hibernation the temperature was artificially increased ; the insects placed in thermostats (one with a temperature of 30°, the other mostly at 22°) were stimulated to

(5) The average temperature for 2 fortnights were :

Period	Room	Outdoor
15-28th February	16.4°	14.5°
1-15th March	19.3°	18.5°

(6) An Arabic name for dry hot desert winds.

Table II

Examples of Distribution of Oviposition in Time

Number of Experiment	Imago hatched	First Oviposition	February	March	April	May	June	July	August	September	October	November	December	Total	Last Oviposition	Death of ♀
Hibernated imagos																
106/4 R	25.10.34	11.3.35	—	10	20	31	2	—	—	—	—	—	—	63	2.6.35	4.6.35
106/15 O	25.10.34	4.3.35	—	22	35	—	—	—	—	—	—	—	—	57	25.4.35	28.4.35
114/13 O	—	11.3.35	—	2	0	7	—	—	—	—	—	—	—	9	26.5.35	8.6.35
129/22 D	—	11.2.35	19	62	31	7	—	—	—	—	—	—	—	119	7.5.35	19.5.35
134 b R	—	20.2.35	12	25	33	38	0	5	—	—	—	—	—	113	12.6.35	17.6.35
P 4 (Thermostat 22°)	—	8.2.35	67	54	31	2	2	—	—	—	—	—	—	156	4.6.35	9.6.35
P 9 (Thermostat 30°)	—	7.2.35	92	12	—	—	—	—	—	—	—	—	—	104	4.3.35	31.3.35
I. Summer-generation:																
195/3 O	2.5.35	14.5.35	5	2	—	—	—	—	—	—	—	—	—	7	2.6.35	27.6.35
196/3 R	2.5.35	12.5.35	—	—	—	24	12	—	—	—	—	—	—	36	14.6.35	25.6.35
II. Summer-generation:																
215/5 O	30.6.35	15.7.35	—	—	—	—	—	2	1	—	—	—	—	3	18.8.35	1.9.35
232/3 O	Ult. July 35	18.8.35	—	—	—	—	—	—	5	18	—	—	—	23?	15.9.35	19.9.35
IV. (?) Generation (*)																
264/11 R	14.10.35	25.10.35	—	—	—	—	—	—	—	—	3	0	0	—	19.6.36	24.6.36
264/12 R	14.10.35	23.10.35	—	—	—	—	—	—	—	—	23	1	0	—	9.4.36	21.4.36
264/14 R	14.10.35	28.10.35	—	—	—	—	—	—	—	—	3	3	8	—	14.4.36	21.4.36

(*) Additional note during proof reading: The mentioned sub-numbers of No. 264 laid further 25, 11, and 15 eggs respectively during spring 1936.

rapid and abundant egg-production. In the following autumn several insects were again put into a thermostat, at about 30° (4.11). In this way it was demonstrated that the hibernal pause in egg-production may be avoided by breeding at high temperatures. Experiments in the winter breeding of *Chilocorus* in an unbroken succession of generations are now going on.

The numbers of eggs laid in spring (February-April) by the hibernated females in the thermostat-experiments (see Table I) exceed those laid in the indoor and outdoor-rearings. In several cases record numbers were reached, especially in the 22° thermostat. It seems likely that most of the females in the thermostat-rearings reached their maximum egg-laying potentiality. Probably they attained this stage (most of the adults of the indoor- and outdoor-breedings failed to attain it) because they were not so strongly influenced by « Hamsins ». The latter possibly check egg production, certainly shorten the average female span of life by killing many individuals which are still fertile.

The temperature conditions demanded by the spring breeding experiment at 22° C could only be fulfilled during the first three months of that season (February-April). For want of a cooling-equipment and the impossibility of improvising one, our thermostat began to give us temperatures as high as 31° as April ended and the long Hamsin period set in. The most important results on egg-production of hibernated insects were already in our possession however by that time. We again suffered from want of a cooling-equipment — and more seriously this time — in our experimental studies in the summer-generations (see p. 306).

Observations on *egg-production of the 1st and 2nd summer-generation in indoor- and outdoor-breedings* showed the numbers of egg laid by these generations to be much smaller than those from the hibernated females. The average number of eggs laid by 18 females of the 1st summer-generation was 16.5 ; the maximum number 70, the minimum 0 (from probably 4 females). This oviposition took place in the 2nd half of May and in June. Still smaller was the number of eggs laid by the few females of the 2nd summer-generation derived from my rearings. Out of 13 females of this generation, which had emerged between June 10th and June 30th fully 7 probably laid no eggs whatsoever. The maximum number laid was 5, the average 2.3 (time of oviposition : July and August). Some very late coming individuals of this generation (July-September) showed a somewhat larger egg production average by about 20 eggs per female (time of oviposition : September and October).

A consideration of the imagos life-time (see Chapter 7) indicates that most adults of the summer-generation I and II lived only some weeks, whereas the adults of the hibernated generations often lived till June.

The small number of eggs is not nevertheless merely due to the short

duration of life. The above discussed experiments in the 30° thermostat show that at so high a temperature the more fertile « winter-generation » already begins oviposition after some days. The number of eggs laid within a few weeks is considerable. (In the course of the first 3 weeks of stay in the thermostat the average number of eggs is already 64).

On the other hand also *the breedings in the 30° thermostat* showed a considerable fall in egg-numbers in the *first summer-generation* and an even greater fall in the *second summer-generation* (see the columns concerned of Table I). The experiments with the first and 2nd summer-generations in the thermostat were performed earlier (end of March till end of April or May) than the corresponding experiment-series with the indoor and outdoor breedings.

Only in rearings controlled throughout can the slight productivity of the summer-generations be established precisely. But observations on *egg-production of imagos gathered from the groves* at the end of May and June showed that summer beetles from the open field have a much diminished egg-production. In this respect, no difference exists between the adults in nature and those reared in the laboratory. We do not know of course, how many eggs the beetles laid in the grove before they were gathered nor to which generation the gathered beetles belonged.

The results reported till now lead us to suppose that slight productivity in the first and more especially in the second summer-generation is a fixed character. We observed this diminution in beetles kept under various conditions, indoors and outdoors, in insects brought to the laboratory from the open fields as well as in those reared at 30° in the thermostat. In the latter case moreover the hibernated females showed a very high egg-production.

But the conclusion that diminished egg-production is a strictly fixed character of the summer-generations specified, is opposed by the results of experiments in the so-called 22° thermostat. (The technical faults of this experiment have already been mentioned p. 305). There 5 females of the summer-generation showed an average production of 35,4 eggs (maximum 56, minimum 20 eggs) which number though not so high as that of the hibernated imagos, is distinctly higher nevertheless than any other that was recorded for a summer-generation.

If the results of two other experiments carried out at this temperature are included in our calculations, the average of egg-production is increased to 57.7 (maximum 151). The high production observed in these two experiments was perhaps due to special circumstances. These, it should be remembered, were feeding-experiments, and accordingly the food offered to these two imagos was in a particularly accessible form (bare *Aspidiotus hederae* bodies). For details of this experiment and for a discussion of the influence of food on *Chilocorus* reproduction in the open fields see Chapter 9.

In order to decide the question whether it is possible by choice of suitable temperatures to bring about a decided increase in the egg-production of the summer-generations, or even to moderate at least the feebleness of the egg-production of these generations it is necessary to carry out a series of experiments at various temperature conditions. For lack of the necessary technical equipment such an undertaking could not be carried out by us.

These experiments are necessary however if we are to learn whether the mass rearing of *Chilocorus bipustulatus* in summer-time under artificially perfected conditions for the purpose of biological control is possible. Similar experiments are equally necessary with regard to the reduction of larvae mortality in the height of summer (see Chapter 6, which also presents some critical considerations on the practical value of artificially enhanced reproduction).

In investigating the causes of low egg-production in summer, the influence of the air-moisture (or of other as yet unknown climatical factors) should not be neglected. Perhaps low air-moisture depresses egg-production or so influences sensitive development stages or generations that the egg-production subsequently suffers.

The *third summer-generation* in my laboratory breedings numbered but few individuals (see Chapter 7). From a total of 9 imagos (male and female) I got in autumn (11.XI) only a single egg.

But 17 females gathered from the open fields in the first part of September showed an average egg-production of 15.2 eggs (maximum 36, minimum 0) for September and October. In the beginning of November four of these observed individuals still continued to lay some few eggs, before the winter-pause in egg-production finally set in. 4 imagos that emerged during 9-18.IX from larvae obtained on 1.IX in the open field still averaged 43,2 eggs (maximum 73, minimum 7) for October and November.

6 females gathered on 11.X in the open field gave a corresponding result, averaging 24,7 eggs (maximum 43, minimum 8) for October and November, before beginning the winter-rest.

Eggs and larvae obtained from adults gathered on 9. and 15.IX in the open field were reared and in the middle of October imagos, which were probably members of a *fourth generation* were thus obtained (see also Chapter 7). These 8 females still laid eggs in October and November (average 8, maximum 24, minimum 1). One of these females even laid another 8 eggs in Desember. In December and in the beginning of January 1 or 2 eggs were also laid occasionally by females of other rearings.

4. Mortality of Eggs.

(see Table III).

In general egg mortality exhibits no very marked fluctuations in the course of the year. The high « mortality rate » observed in June is more probably a consequence of experimental conditions which cause a larger incidence of « addle » eggs (see below) than an expression of increased mortality.

As a rule all the eggs produced in the different glasses and tubes in the course of two days were put together in one Petri dish. The hatched larvae were removed from the Petri dishes and then in most cases isolated for individual rearings. In June 1935 however the eggs produced by different imagos were not put together in a single dish ; in this month the 2-day period egg-productions of every female were kept separately in little glass-tubes. This method was adopted in order to decide whether during the period of feeble reproduction when egg production (i.e. egg numbers) is known to be

Table III

Mortality of Eggs.

Time of oviposition	1934		1935	
	Number of Eggs	Eggs Yielding no Larvæ	Number of Eggs	Eggs Yielding no Larvæ
January	—	—	—	—
February (28.1-28.2)	—	—	221(*)	38.9%
March	—	—	—	—
April (23.3.-30.4)	97	31 %	—	—
May	111	44 %	100	49 %
June	113	52 %	237	51.5%
July	72	46 %	39	38.5%
August	98	47 %	33	42.4%
September	—	—	80	30 %
October	53	45.3%	272	35.3%
November	30	44.6%	24	41.7%
December	—	—	—	—

(*) Partly laid in the Thermostats, but studied for development — capacity outside.

small, the proportion of eggs incapable of development is increased. No essential differences in development capacity were found however between eggs produced by females of the summer-generations and eggs of other generations (see Table IV). Many of the eggs laid by still surviving hibernated imagos on the other hand were incapable of development. Extracts from

breeding-protocols here not published would show that in June 1935 out of 18 surviving hibernated females still laying eggs only 6 produced eggs capable of development, and 12 only addled eggs. But as these 12 females were among the best layers in the months of spring, we are perhaps justified in concluding that their sperm-stores were spent; all of them had been kept in solitary confinement for months.

In any case, the investigation of egg mortality in the course of the year revealed that the low increase of *Chilocorus bipustulatus* in summer is not due to an increased egg-mortality. Even though egg-mortality is occasionally

Table IV

Development capacity of Eggs of June 1935.

Out of	65 eggs	laid by hibernated females.....	72.3 % gave no larvæ
Out of	149 eggs	laid by females of summer-generation I.	44.2 % gave no larvæ
Out of	24 eggs	laid by females of summer-generation II.	45.8 % gave no larvæ
Total	238 eggs		51.5 %

somewhat greater in May and June than in the months of spring and autumn, it does not play a decisive part in checking the increase of *Chilocorus*. The marked decrease of *egg-production* (discussed in the preceeding Chapter) and the greater larvae mortality (see Chapter 6) are themselves sufficient to explain the summer depression of *Chilocorus* reproduction.

5. Duration of Development.

All the results of the many individual breedings which reached the imago stage are collected in Table V. The shortest time of development, about 30-31 days, was shown by eggs laid between 17.V and 23.V in the room. Eggs laid from May to the end of September showed a total development time of from 30-40 days for the mid-summer period. In spite of this quick development however, the months of June and July are of relatively small importance for reproduction, on the one hand as has already been pointed out because of the very low egg production of summer-generations I and II and also because of the high mortality of the larvae at the height of summer.

At the time of richest egg-production — in spring towards the end of March and the beginning of April — the development runs its full course in about 50-55 days, almost double the time of the mid-summer development. As is to be expected similar figures for the total development time are found again in autumn. The few eggs laid towards the end of October gave imagos

by the middle of December. Some eggs laid as late as November and the beginning of December still gave a successful development of larvae; the whole development took 84-120 days, the adults emerging in February and March.

A very early beginning of oviposition in January and in the beginning of February does not lead to any considerable increase in *Chilocorus* numbers, since the development-time of the first larvae in spring is correspondingly long. Eggs, laid between 28.I and 28.II, a time interval of more than 4 weeks, produced imagos simultaneously in the last days of April.

No temperature curve of development was set up. In this country's climate the rise and fall of temperature during the day is sometimes very marked. The temperature control in my breedings, which were performed without the aid of a thermograph, merely by reading off the daily maximum- and minimum temperatures and by using the arithmetical mean as the day's average was not exact enough for this purpose. Moreover, the development at least in cases of longer total development periods, began and ended under very different temperature conditions. The average temperatures which are listed in the Table furnish but a very imperfect indication of the amount of heat at the insect's disposal during its development.

I do think however that the data presented in this Table are sufficient and clear enough for the practical study of *Chilocorus* « gradation » (rate of increase).

Our observations were supplemented by breedings of *Chilocorus* in thermostats: 101 successful individual-rearings in a thermostat at nearly 30° from the beginning of February till the beginning of May, and 79 successful individual-rearings in a thermostat at nearly 22° from the beginning of February till the beginning of April. Temperatures in the improvised thermostats rose somewhat towards the end of the experiment. The results were therefore grouped separètely.

Thermostat I:

79 individual-rearings at an average temperature of 27.7°. Average development time 32 days. (The shortest development time 30 days; some few individuals lagged considerably behind the average and took 36 and 37 days for full development; 2 individuals needed 40 days.)

13 individual-rearings at an average temperature of 29.8°. Average development time 31.3 days (max. 37 and 39 days, min. 26 days.)

8 individual rearings at an average temperature of 30.2°. Average development time 25.2 days (max. 28 days, min. 23 days.)

Thermostat II:

79 individual-rearings at an average temperature of about 22°. Average development time 47.8 days (max. 51 days, min. 45 days).

Table V

Duration of Development

ROOM-BREEDINGS

Experiment number	Number of individuals	Date of oviposition	Development in days: Eggs	Larvae	Pupae	Imagos emerged	*Duration of total development in days*	Average Temperature
Spring 1934								
002B	1	25.III	7	28	10	9.V	45	21°
008	2	31.III	13.5	24.5	11.5	15.IV-24.V	49.5	21.8°
Summer 1934								
009	3	2.IV	13	24	9	18.V	46	22°
Autumn 1934								
114	2	21.X	7	28	15.5	9 & 12.XII	50.5	22°
119	1	25.X	10	25	18	17.XII	53	21.1°
Winter 1934/35								
138	1	29.XI	25	81	14	29.III	120	15.3°
139	2	2.XII	18.5	78.5	15	22 & 26.III	112	15°
Spring 1935								
144	3	28.I	23.7	46	15	22-26.IV	84.7	18.9°
145	4	30.I	28	43.5	14	26-28.IV	85.5	19°
152	15	7.II	25	41.6	11.9	26-28.IV	78.5	19.7°
158	6	11.II	24	40.7	10.8	26-28.IV	75.5	19.8°
162	5	12.II	23	46.8	10.8	26-30.IV	74.6	19.8°
168	5	18.II	21	39.2	8.5	26-30.IV	68.7	20°
169	14	19.II	20	36.5	10.8	26-30.IV	67.3	20.2°
170	10	20.II	18.3	36.9	11.6	26.IV-2.V	66.8	20.3°
174	3	28.II	11	38	10	26-30.IV	59	20.5°
Summer 1935								
184	11	29.III	13	25.1	8.8	12 17.V	46.9	22.7°
201	7	9.V	9.1	16	7.1	8-12.VI	32.2	26.6°
202	2	17.V	9	15	7	17.VI	31	27°
205	4	21.V	7	17	7	21.VI	31	26.9°
206	10	23.V	7.4	16.4	6.2	21-23.VI	30	27°
218a	1	18.VI	7	24	4	22.VIII	35	28.5°
221	1	25.VII	8	20	6	28.VIII	35	28.3°
244	14	11.IX	7	20.1	6.1	14-16.X	33.3	27°
248	7	15.IX	8	20.9	6.7	16-25.X	35.5	27.1°
251	2	27.IX	7	21	6	1.XI	34	25.9°
253	5	30.IX	7.8	20.6	10.2	7-10.XI	38.6	24.6°
Autumn 1935								
255	1	4.X	7	26	12	18.XI	45	23.5°
256a	1	6.X	8	24	14	21.XI	46	23.0°
275	8	23.X	10.3	40.2	19.4	24.XII-6.I	69.9	19.4°
280	11	28.X	11.2	42	23.8	6-22.I	77	18.5°

162 individual-breeding altogether

OUTDOOR-BREEDINGS

Experiment Number	Number of Individuals	Date of oviposition	Development in days: Eggs	Larvae	Pupae	Imagos emerged	*Duration of total development in days*	Average Temperature
Summer 1934								
030	3	18.IV	11	31	8.3	3-12.VI	50.3	24.7°
031	1	22.IV	9	35	7	12.VI	51	23.3°
037	4	7.V	11	29	7.2	21-26.VI	47.2	25.3°
040	2	13.V	12	30	8.5	29.VI-6.VII	50.5	25.5°
043	1	18.V	9	30	6	2.VII	45	25.4°
044	1	21.V	7	27	5	29.VI	39	25.4°
Autumn 1934								
113	1	21.X	11	24	14	9.XII	49	22.2°
116	3	23.X	8	28	10	9.XII	46	23°
123a	1	30.X	9	23	22	24.XII	54	20.3°
123b	1	30.X	9	34	27	10.I.35	70	
Winter 1934/35								
125	1	9.XI	9	64	24	14.II	97	18.1°
126	1	15.XI	12	41	31	17.II	84	17.6°
Spring 1935								
153	2	7.II	28	50.5	5.5	2.V	84	18.9°
166	11	14.II	23.8	45.4	5.7	2-8.V	74.9	19.2°
173	18	24.II	18.5	43.3	6.6	2-8.V	68.4	19.9°
Summer 1935								
182	2	28.III	19	32	9	24 & 30.V	60	22.9°
188	4	4.IV	17	26.7	7.8	24-28.V	51.5	24.7°
204	5	20.V	7.2	22.8	5.6	20-23.VI	35.6	25.8°
207	5	24.V	8.2	20	7	27-30.VI	35.2	25.8°
218b	1	18.VI	4	24	4	22.VIII	35	27.4°
219	1	19.VII	9	21	4	22.VIII	34	27.4°
220	4	22.VII	8.5	20.7	6.8	25-28.VIII	36	27.2°
226	3	4 & 5.VIII	7.7	20	7	6-12.IX	34.7	27.8°
227	1	6.VIII	8	23	5	11.IX	36	27.8°
233	1	18.VIII	9	16	5	17.IX	30	28°
234	1	20.VIII	7	19	7	22.IX	33	28°
239	1	5.IX	7	17	9	8.X	33	28.
240	4	8.IX	7	20.2	6.3	10-13.X	33.5	28.8°
243	1	10.IX	7	21	7	15.X	35	27.9°
245	1	12.IX	10	21	7	20.X	38	28°
249	5	24.IX	8.2	20	9.4	24.X-6.XI	37.6	27.2°
250	4	29.IX	9	20	13.75	6-11.XI	42.75	25.6°
Autumn 1935								
254	1	1.X	9	24	15	18.XI	48	2.49°
274	2	22.X	10	55.5	26	13 & 30.I	91.5	2.02°
277	1	24.X	10	50	30	22.I	90	20.2°
281	6	30.X	10.5	49.2	25	22-30.I	90.7	19.5°

105 individual-breeding altogether

Table V reports also on the distribution of the development-time *among the different stages* (*egg*, *larva*, *pupa*) at various times throughout the year. The shortest and the longest development time noted in the table are separately set down below:

shortest time of egg stage ..... 7 days;
longest time of egg stage ..... 28 days;
shortest time of larva stage ..... 15 days;
longest time of larva stage ..... 81 days;
shortest time of pupa stage ..... 4 days;
longest time of pupa stage ..... 31 days.

Normally *4 larva stages* were observed but now and again one or two more moultings were noticed.

Development with only 3 larva-stages also seems to be possible, and in some few cases I counted a still smaller number of moultings. Yet it hardly seems to be probable that an insect which normally moults four times in the course of its development and also exhibits considerable growth during all of this time is able to develop with only 2 moults. It is more plausible to assume in these few cases that the empty skins were eaten by the larvae.

Table VI

Examples of Single-Stage Development Times
(rearings at constant temperatures).

Number of Experiment	Number of Individuals	Temperature	Development Time in Days						
			Egg	Larva I	Larva II	Larva III	Larva IV	Pupa	Total
163	7	27.7°	7.7	6	3.1	3.1	6.6	5.7	32.3
151+164	18	22°	11.1	6.2	4.8	4.7	11.7	8.8	47.3

For description of all the experiments at constant temperatures see Text.

Table VI gives two examples of the distribution of development time among the various larva-stages in rearings which were carried out at an approximately constant temperature. Only individual rearings which definitely showed 4 moults are taken into account in this Table.

6. Mortality of Larvae and Pupae.

The mortality in the course of the year is traced in Table VII.

In order to obtain numbers large enough for the calculation of percentages longer periods are summed up now and again in this Table. These summations were only carried out of course for periods during which the mortality rates despite differences in the individual experiment series remained nearly constant.

The observations of larva mortality yielded one very distinct and important result: Mortality of larvae is extremely high in the mid-summer months June-August. In the experiments of 1934 I was altogether unable to rear larvae during this time. The following year, the mortality of larvae at this time was between 70 and 90%.

High mortality characterized not only larvae formed from eggs produced by imagos of the 1st and 2nd summer-generations, but also larvae hatched from eggs laid by old hibernated insects. The experiments in the thermostates show that the high mortality is not necessarily caused by high temperature. At the time of high mortality the temperatures at least in the room-breedings fluctuated little and stayed at about 30°.

The 30° thermostat experiments which showed but a low mortality rate (18% of 97 larvae) the larvae were reared from eggs laid in February by hibernated females (larvae of summer-generation I). The rearing of the following generation even those carried out in the 30° thermostat showed a considerably higher mortality rate: out of 43 larvae 26 (=60.5%) died.

Table VII

Mortality of Larvae and Pupae.

1934					1935				
Oviposition time of eggs used in larvæ rearings	Number of larvæ	Number of imagos obtained	Number of larvæ which died	Larval mortality in %	Oviposition time of eggs used in larvæ rearings	Number of larvæ	Number of imagos obtained	Number of larvæ which died	Larval mortality in %
					February (*)	113	74	39	34.5%
18.-21.IV	68	23	45	62%	March-May	83	49	34	41 %
					June	15	2	13	86.7%
19.VI-27.VIII	91	0	91	100%	July	74	8	66	89.2%
					August	22	7	15	68.2%
					September	63	44	19	30.1%
16.X-30.XI	13	14	17	54.8%	October	66	30	36	54.5%
					November	1	0	1	—
6.XI-2.XII	14	5	9	64.3%	December	—	—	—	—

(*) In this month the eggs were received from Thermostats; rearings however were carried outside.

The Summer-generation I rearings in the 22° thermostat, also from eggs produced in February by hibernated females showed 32 deaths out of a total of 118 larvae (=27%). Rearings of Generation II under the same conditions were not possible for want of cooling equipment or adequate means to improvise one.

A high mortality in so far as it was met was found in the 1st and 2nd instars seldom in the 3rd and 4th instars. Mortality of pupae is very low, and is therefore included in the numbers of dead larvae in Table VII.

In autumn the mortality of larvae fell again. In November and also in December, larvae could be found that succeeded in finishing their development, though slowly.

In general, mortality of larvae was smaller in the 2nd year of experiments. An explanation of this difference is suggested at the end of Chapter 9.

The reasons of insufficient larvae development in mid-summer can only be ascertained by exact experimental studies. Special interest attaches to the question whether the high mortality rate is due to dispositional factors in the various generations or to the influences of the Palestinian summer climate. A study of the effect of temperature and air moisture combinations is particularly desirable. Here also the same requirements which were met in the observation of egg production must be fulfilled. Only an exact study can throw light upon the prospects of breeding *Chilocorus* in mid-summer with better success under artificially improved conditions than is the rule in nature.

But even if the laboratory experiments succeed, it by no means follows that the biological control of *Chrysomphalus aurantii* by means of large scale distribution of *Chilocorus* is certain of even a one time success. In the open fields *Chilocorus* shows its summer depression in reproduction (extremely low production of eggs and high mortality of larvae) just at the time when the *Chrysomphalus* mass increase begins (see Bodenheimer, 1934) (7). In order to be effective against *Chrysomphalus aurantii*, the distributed beetles must presumably not only be able to stay alive for some time but also to multiply considerably. The feeding activity alone of the distributed beetles even though they be very numerous will scarcely suffice to check the increase of *Chrysomphalus aurantii*; a sufficient degree of fertility and the successful passing of the first larva stages which fall far short of the elder larva stages as far as feeding goes, seem likewise to be necessary. (See in this connection p. 323 for description of a field experiment).

These considerations notwithstanding it is quite conceivable that new observations in nature will moderate these findings. I would, therefore, consider it inadvisable to discontinue the study of the possibilities of improving *Chilocorus bipustulatus*' reproduction in the directions outlined above. The

(7) Hadar VII, 16, pp. 139-145.

economic importance of the control of *Chrysomphalus aurantii* is such that we cannot afford to reject without careful study even the narrowest avenue of hope. For want of technical equipment I was unable to obtain results of sufficient accuracy just in those aspects of the investigation whose practical importance is greatest, and only approximate results unfortunately gain us nothing as far as questions of economic importance are concerned.

7. Duration of Imago's Life and Number of Generations.

Graph I traces the numeric decrease of the *hibernating imagos*. In October and November, 1934, a great number of imagos was gathered in the open field and subjected to indoor and outdoor confinement. A relatively small part of them — 14.4% — died after a brief period of confinement in October and November. Until the end of April in the next year the mortality in the

Graph I

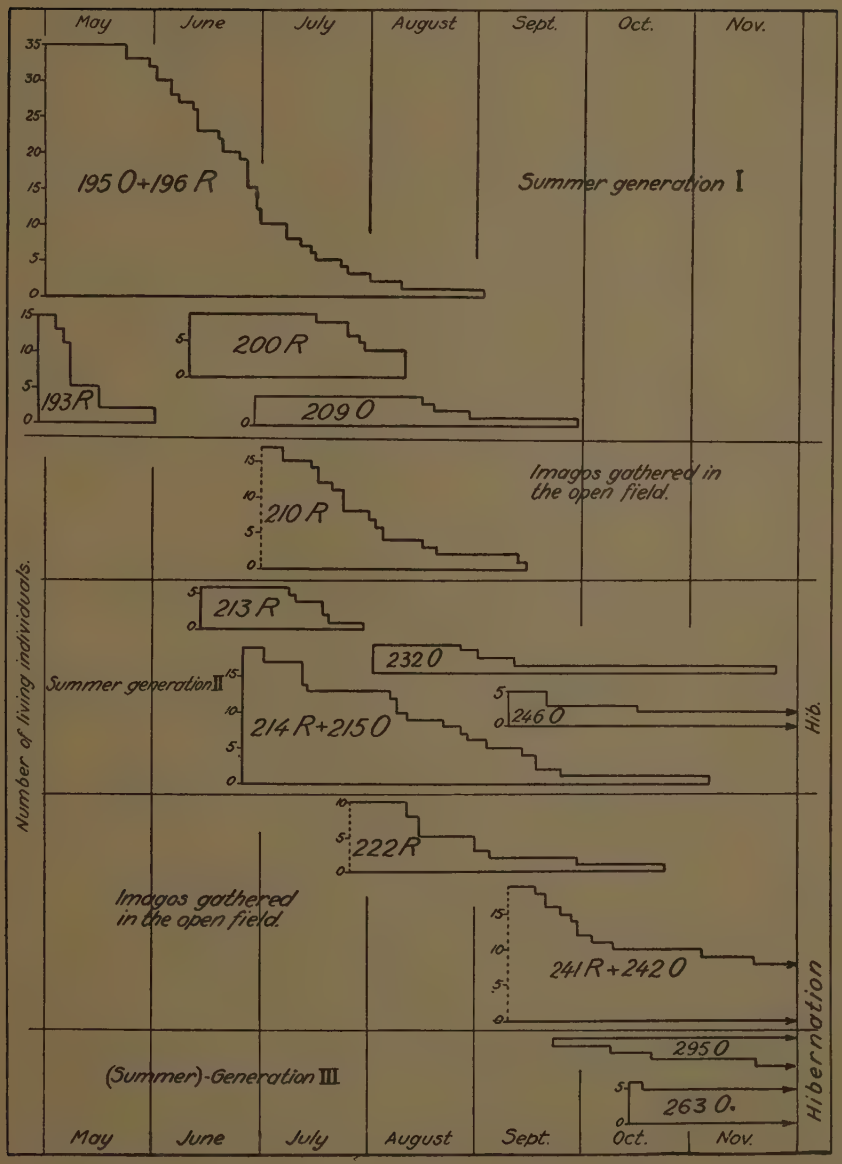
Length of life of hibernating imagos

different months was relatively small; 60% of the insects survived the hibernal confinement in the end of April i.e. survived fully a half year of confinement. The deaths began to pile up towards the end of April and the beginning of May. We already mentioned this fact in the Chapter on egg production, and we there supposed that the long lasting « hamsin » was the cause of death. In the course of May, mortality was again smaller, whilst in June the increased death rate wiped out almost all that was left of the hibernated imagos. The four last imagos of the winter generation died between the 3rd and the 21st of July.

Beginning from 31.I, some imagos had been kept at a temperature of 30°

Graph II

Length of life of summer imagos.



in the thermostat. These insects which are omitted from Graph I died sooner than those in the room and outdoor breedings. As all the females implicated had produced a high number of eggs, we may suppose that the permanent stay in high temperatures had enabled them to fulfill « the aim of their life » relatively sooner; their strength exhausted, they died a natural death of « old-age » in the end of March and in April. The same may be assumed with regard to the death of the insects in the room breedings, that died as late as June and July.

The Graph II shows how short the life of most individuals of the *summer-generations* is. The curve showing the results of experiment No. 193 indicates the death of 11 imagos within a fortnight. Possibly however these deaths were the effect of the hamsin, which has already been mentioned. Ordinarily, the main body of the first summer-generation died in its second month of life (See the curves for experiments Nos. 195 O and 196 R, 200 R, and 209 O). The average life-time in the different experiment rows, No. 193 excluded, ranged between 42.5 and 62 days.

Summer-generation II, which in my rearings first reached the imago-stage in June, was also rather short-lived. (See curves 213 R, 214 R and 215 O, 232 O, and 246 O). The mortality curves of imagos gathered in the open fields (Graph II includes some of them) were analogous to those of imagos reared in the laboratory in the same season.

The *thermostat breedings* again are in accord with the indoor and outdoor breeding experiments. In the former both the 1st and 2nd summer-generations were reached earlier in the calendar year. The average life time of imagos of the 1st summer-generation was ascertained out of 27 individual-breedings to be 54.6 days. The average for the second summer-generation of 9 individual rearings was considerably smaller and only reached 30.1 days.

Owing to the low egg production of the first two summer-generations and to the high mortality rate in mid-summer, my rearings yielded but few *imagos of a IIIrd (summer) generation*, and even these probably somewhat later than they would have appeared in nature. These few imagos passed into hibernation without significant numeric losses but also without any autumnal oviposition worthy of mention. Imagos gathered in the open fields in September and in the first half of October however had an oviposition in September and October (as has already been mentioned in Chapter 3). Some of these individuals moreover laid a rather large number of eggs. By rearing larvae from eggs laid by such females on 11 and 15.IX. I got imagos which entered hibernation even as did their parents. Let us assume that imagos gathered in September and October were as those of the laboratory rearings in general members of a third summer-generation. Then, on rearing autumnal larvae a *IVth generation* hibernating simultaneously with its parents must have been obtained. The increased oviposition in the beginning of autumn, and the

subsequent rise of a fourth generation swelled once more the stock of *Chilocorus* imagos which had been depleted considerably by the high larvae mortality in mid-summer and the low rate of oviposition of the first and second summer-generations.

The main-body of hibernating imagos in Palestine probably consists of individuals of the third and fourth generations; occasionally also some individuals of the second summer-generation live to survive the winter. Moreover it is not impossible that a small part of the hibernating individuals belong to a fifth generation which traces its origin to the first ovipositions of its parent and fore-parent. The marked overlapping of generations is due on the one hand to the longevity of the imago, and on the other hand to the duration of oviposition often over a period of weeks. (See p. 303, and Table II).

This result which showed the third and fourth generations to be the hibernating generations was only reached in autumn 1935, shortly before this manuscript was concluded. In the preceding year I could get no hibernating individuals either from my summer rearings in the laboratory or from beetles gathered in the open fields. Only beetles gathered in October and November gave the desired result; by the further observation of these beetles the material for Graph I already discussed above was obtained. The autumnal oviposition in 1934 was of a lower rate than in 1935. Possible causes of this distinct behaviour are mentioned at the end of Chapter 9.

8. Pre-Oviposition Period.

The imagos of the first summer-generation (dates of emergence: 2.V., 26.-30.IV., 15. and 30.V.) had pre-oviposition periods lasting from 6-12 days. The corresponding period for the individuals of the second summer-generation lasted even longer. The females of this generation which were obtained at very different times (June-September) sometimes « dallied » long before they laid the one or few eggs, they finally produced. The pre-oviposition periods thus ran into 15, 20, 21, 44, and even 51 days. In one case however there was also a short pre-oviposition of only 7 days.

In the 30° thermostat rearings of the first summer-generation the pre-oviposition periods lasted between 8-30 days. For the second summer-generation (only 2-egg laying females) two pre-oviposition periods, one of 3 days and another of 14 days were noted. In the 22° thermostat rearings of the first summer-generation 4 females began oviposition after 14 days, 2 after 16 days, and 1 after 19 days.

In the preceding Chapter mention was made of offspring of presumably the fourth generation, which were reared from autumn imagos. These offspring began their oviposition towards the end of October and at the beginning of November; the pre-oviposition periods lasted respectively 8, 10, 10, 12, 12, 13, 14, and 29 days.

Autumn insects which laid no eggs seemingly that same season and began oviposition only in spring, must be credited with very long pre-oviposition periods. Frequently I have waited 130 days (till March 14th) for the first oviposition of imagos gathered from the open fields in autumn 1934. Some oviposition also occured in the middle of February however. The possibilities of shortening the winter-imagos' pre-oviposition-periods or the oviposition-pause were already discussed in the Chapter on egg-production.

9. Food-Quantity.

The biologist whose task it is to ascertain practical value of an enemy of a given noxious insect must not only study « graduation » (rate of increase) but must also ascertain how many noxious insect individuals the enemy feeds on per day or within a given period of life or development. Unfortunately however our study of the economically important relationship of *Chilocorus bipustulatus* to *Chrysomphalus aurantii* encountered difficulties which rendered the further pursuit of this question impossible.

It seemed at first to be a promising method of attack simply to take a citrus-leaf covered with *Chrysomphalus aurantii*, with the help of a needle to remove all larvae clinging to it, to count the remaining females all more or less of equal size still on the leaf and then to offer it to *Chilocorus* as a known food ration. We were unable however to recognize at a glance how many females were borne on a leaf, and how many relatively firmely fixed empty scales of dead females were to be found among the living. For it is necessary to turn an insect with a needle, sometimes even to pierce it, in order to decide whether there is a living female under the scale.

At first I attempted to circumvent this difficulty by arithmetical calculations. On the completion of the experiment I counted the number of living lice and « dead » lice (scales without living content) on experiment leaves offered to a *Chilocorus* (imago or larvae) and on control leaves kept under the same conditions i.e. in glass dishes for 24 hours. The percentage of « dead » insects on the controls after the 24 hours of the experiment was deducted from the percentage of « dead » insects on the leaves of the feeding-experiments. From the percentage difference I could estimate the actual quantity of lice presumably consumed. Sometimes I got results that seemed to be fit for use, but sometimes also I actually obtained negative food-quantities. This method of estimation therefore proved to be unserviceable. The proportion of « dead » to living larvae on the leaves varies too much. Possibly also the mortality rate differs considerably in the course of the 24 experiment hours on the control and on the experiment leaves, being higher may hap on the former than on the latter.

In order to obtain some idea, however, of the food needs of *Chilocorus*-

beetles and larvae I set up some feeding experiments with *Aspidiotus hederae*. The bodies of these lice (contrary to those of *Chrysomphalus aurantii*) can easily be lifted out of their scales, especially so since their slender ventral-scale is far more fragile than the ventral scale of *Chrysomphalus aurantii* and adheres less firmly to the inner fringe of the dorsal scale. The thick fleshy bodies of the adult females and elder larvae can easily be lifted from the leaf with the aid of a needle and put on a glass. In this way I was able to feed known numbers of bare *Aspidiotus hederae* bodies to an adult or larva *Chilocorus*. It was easy to establish how many of these bodies the *Chilocorus* had consumed in the course of 24 hours, either entirely, or almost so (all leavings being dry and insignificant-looking). The bodies of *Aspidiotus hederae* kept fresh enough for use in this experiment, even when loosened from the leaf and without protection of the scale. No value attached to the distinction of *Aspidiotus* females from elder larvae; the point stressed always was that food-pieces of nearly the same size were used.

If for any reasons the experiment series had to be interrupted, the beetles were not famished in the interval but fed in the usual way with leaf-pieces covered by lice. Column 5 of Table VIII gives the real numbers of experiment-days.

This Table is based upon results of experiments with *22 imagos* performed at different times and under various conditions. Naturally it is difficult to form a clear picture from these numbers of the food-quantities which *Chilocorus* really consumes under natural conditions. *Chrysomphalus aurantii*-females are smaller than *Aspidiotus hederae*-females, and must therefore be consumed in greater quantities. By using smaller larvae the number of lice consumed may be increased to a value higher than that obtained in our rather artificial experiments.

The Table shows in particular that the food quantity required varies with the temperature and is higher in the case of egg-laying females. We have already mentioned (p. 306) on the other hand that possibly egg-production might be increased by placing an abundant and easily available food supply at the disposal of the female.

The total food requirement of a *Chilocorus* larva during its development-time is more difficult to determine than that of an imago. The method in which bare *Aspidiotus hederae*-bodies in glass-dishes are used as food is well suited to middle-sized and older larvae, but is found wanting in experiments with younger larvae which consume but small quantities of food and do not wholly eat the *Aspidiotus*-bodies, but only gnaw at them. Thus we were unable to ascertain the quantity of food a larva really needs at the beginning of its life. I could only use partly grown-up larvae, therefore, mostly in the middle of their second stage of development in the experiments. Consequently I was also unable to ascertain the total food-quantity required during the full-

Table VIII

Feeding Experiments with Imagos.

(Food : Bare *Aspidiotus hederae* bodies)

Experiment Number	Sex	Time of Experiment	Number of lice bodies fed	Number of observation days	Average amount of food per day	Maximum	Minimum	REMARKS
Experiments in Autumn 1934 *Hibernating imagos*								
109a R	F	1.29.XI	53	17	3.1	10	0	Average temperature
109b R	M	»	53	17	3.1	9	0	Room : 22.25°
121/4a R	M	»	52	17	3.1	8	0	Outdoors : 23.3°
121/4b R	F	»	34	17	2	5	0	
117/1 R	M	1.XI-3.XII	129	19	6.3	19	1	
117/2 R	F	»	74	19	3.9	9	1	
117/3 R	F	»	67	19	3.5	11	0	22-29.XI : 6 eggs
117/9 O	—	1.XI- 8.XI	9	4	2.25	5	0	died 11.XI
117/10 O	F	1.XI-27.XI	162	15	10.8*	16	5	15-29.XI : 6 eggs
117/11 O	F	1.XI-23.XI	62	13	4.8	7	1	
Average amount of food per day of 10 individuals : 4.3								
(*) This considerable rate of food consumption fell during the subsequent 4 weeks (27.XI-27.XII) when the average food consumption per day for 23 observation-days was 1.9.								
Stay in Thermostat (Average Temperature ca. 30°) Imagos of Summer-generation I.								
175/17	M	31.III-2.V	119	29	4.1	13	1	
175/18	F	31.III-8.IV	48	8	6	8	3	1-7.IV : 19 eggs ; 8.IV.♀ was lost
175/20	F	31.III-12.IV	65	15	5.4	8	0	9 14.IV : 24 eggs ; 12.IV.♀ was lost
Average amount of food per day of 3 individuals : 5.2								
Stay in the « 22° Thermostat » Imagos of Summer-generation I.								
180/1	F	142-8.IV	93	12	7.75	13	3	9-28.IV : 38 eggs; 28.IV. ♀ was lost
180/3	M	14-30 IV	77	14	5.5	9	3	30.IV. ♀ was lost
180/4	F	14.IV-24.V	346	39	8.9	19	2	11.IV-24.V : 121 eggs; 24.V. Expt. discontinued
180/5	F	14.IV-24.V	285	38	7.5	20	0	11.IV-24.V: 76 eggs
Average amount of food per day of 4 individuals : 7.4								

Experiment Number	Sex	Time of Experiment	Number of lice bodies fed	Number of observ-ation days	Average amount of food day	Maximum	Minimum	REMARKS
Experiments in Summer 1934								
F_2 — R	F	8-22.VIII	169	9	18.7	24	13	15-21.VIII : 14 eggs
F_3 — R	F	»	68	9	7.5	11	2	10.VIII : 1 egg
F_8 — R	M	»	79	8	9.9	14	8	
F_0 — R	M	»	72	8	9	17	4	Average temperature
Average amount of food per day of 4 individuals : 11.3								8-22.VIII: ca 28.7°
Experiments in Autumn 1935								
264/1 R	3 M and 1 F	20.X-29.XI	120	38	3.2	10	0	
264/3 R		»	98	38	2.6	10	0	
264/4 R		»	101	38	2.7	9	0	
264/6 R		»	109	40	2.7	11	1	Average temperature
Average amount of food per day of 4 individuals : 2.8								20.X-29.XI : ca 12°

development time. Nevertheless the 14 food-requirement results registered in the Table IX give a fair picture of the actual food requirement. The food-quantity presumably consumed at the beginning of life is small compared to the total food quantity required by the later development-stages. In the cold season, when the development time is long, the food-quantity required for total development is greater than that required in warm surroundings when the development-time is correspondingly short. This despite the fact that the daily food-requirement is a little higher at higher temperatures.

Though I have not carried out exact experiments on the influence of the available amount of food upon the propagation rate and length of development of *Chilocorus*, I nevertheless feel justified on the strength of my breeding-experiments in expressing an at least tentative opinion on this question. Undoubtedly food quantity exerts some influence. On p. 313 the reader's attention was drawn to the rather low mortality of larvae in the second year experiments ; on p. 317 again a discrepancy in the behaviour of autumnal imagos in the two successive experiment-years (1934 and 1935) was mentioned. The favourable breeding results in the second year are attributable at least in part to improved feeding-opportunities. In the first year be it remembered the diet adopted did not yet consist exclusively of Acacia leaves heavily infested with *Aspidiotus ;* and I had perforce to be content with *Lonicera*-leaves likewise thickly infested with *Aspidiotus hederae* and sometimes even with citrus leaves infested by *Chrysomphalus aurantii.*

In nature also food-availability must be important. *Chrysomphalus*

Table IX

Feeding Experiments with Larvae.

(Food: Bare *Aspidiotus hederae* bodies)

Experiment number	Date of origin of Larvæ	Beginning of experiment	Estimated stage of larvæ at the beginning of the experiment	Number of lice bodies fed	Number of observation days	Average amount of food per day	Maximum	Minimum	Larval contraction previous to pupation	Pupæ
Autumn Experiments										
1934										
132/8 R	25.IX gathered from the	25.XI	Middle sized	107	32	3.3	9	0	26.XII	10.I.35
132/9 R	open field	25.XI	larva	111	29	3.8	15	0	23.XII	7.I.35
Average				109		3.5			Average Temperature ca. 18°	
1935										
255/7 R	hatched 11.X	17.X	Beginning	68	13	5.2	11	1	30.X	6.XI
255/10R	» 14.X	17.X	of	92	18	5.1	12	0	4.XI	12.XI
255/11R	» 14.X	17.X	2nd stage	81	40	2.0	7	0	26.XI	
Average				80		4.1			Average Temperature ca. 25°	
Spring Experiments										
182/160	hatched 26.IV	26.IV	Beginning of 2nd stage	87	21	4.1	14	0	17.V	22.V
									Average Temperature ca. 26°	
30°-Thermostat										
177/7	hatched 20.III	31.III	Middle	78	12	6.5	18	0	13.IV	16.IV
177/8	» »	»	Beginning of 2nd stage	62	18	3.4	20	0	19.IV	23.IV
177/10	» »	»		60	11	5.4	10	2	12.IV	16.IV
177/11	» »	»		78	13	6.0	14	2	14.IV	16.IV
177/13	» »	»		72	15	4.8	20	0	16.IV	23.IV
Average				70		5.2			Average Temperatu ca. 20°	
22°-Thermostat										
			2nd stage							
179/1	hatched 3.IV	14.IV	small	67	16	4.2	8	1	29.IV	3.V
179/3	» »	»	middle	58	16	3.6	8	0	29.IV	3.V
179/7	» »	»	middle	47	13	3.6	10	0	26.IV	30.IV
Average				57.3		3.8			Average Temperature ca. 25°	

aurantii numbers fall quite low some seasons, and even when scale infestation already seems rather threatening to the planter, in fact the lice must still be sought if they are to found by the beetles and the less agile larvae. It seems not improbable that apart from difficulties connected with climate, a considerable increase in *Chilocorus* numbers only becomes possible when an economically dangerous Red-Scale infestation is already well established. No great practical value can be unconditionally ascribed to a Red-Scale enemy whose mass increase requires the presence of the food-insect in quantities which are already economically dangerous. On the other hand, the possibility of rearing *Chilocorus* on Acacia leaves heavily infested with *Aspidiotus hederae* seems to open a possibility of mass propagation for this insect enemy, which could then be set free for use in scale control. Repeated *Chilocorus* liberations in the groves would be necessary, however, because of possible temporary food shortage, and also because of the propagation depression, which is either inherent in certain generations or is caused by the mid-summer-climate.

10. Field Experiments.

On July 11th, 1935 in Even-Jehuda in the north of Sharon a field experiment was begun in a grove of 4 years old ungrafted sweet lime trees heavily infested with *Chrysomphalus aurantii* (8). The trees had been transplanted to the grove in the summer of 1933 as so called one year old stocks. In the course of the experiment 2 experiment-trees and a control-tree were placed under wire screens, 2 m. high and 1 m. square; 2 control-trees remained without wire screens. The other trees of the grove had been successfully sprayed some days before with one of the usual oil-emulsions. Before beginning the experiments I removed as many *Chilocorus* from the experiment- and control-trees as I could detach.

On the 11th of July 40 *Chilocorus*-imagos — rather a considerable number in all, — were introduced into the first experiment cage. The insects were of various origins; some of them had been taken from an *Acacia* heavily infested with *Aspidiotus hederae*; more than half of them had just been gathered from the citrus trees of the same grove.

The control tree was screened on July 11th.

The second experiment was only begun a fortnight later on 25.VII. In this case only 4 imagos from an Acacia infested with *Aspidiotus hederae* were introduced into the cage. Just before the screening 14 imagos and 2 pupae had been removed from the experiment tree.

It is not impossible that despite the care exercised some imagos or larvae

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(8) I have to express my thanks to Mr. J. D. Oppenheim and Mr. S. Baumgart, manager of the Hanotea Works, or the permission to carry out this experiment and their assistance thereby.

escaped notice during the cleaning and remained in the tree crowns. The experiment cages may therefore possibly have contained some few *Chilocorus* more than here reported and also the enclosed control-tree may not have been really as wholly free from *Chilocorus* as has here been implied.

The result obtained on 9.X.1935 was surprising and hardly in line with our expectations. All three trees that had been enclosed during the three month period, showed an extremely heavy infestation with *Chrysomphalus aurantii*. The tree in the first cage was less heavily infested however than the second experiment-tree or the enclosed control-tree. Nevertheless the infestation of experiment-tree I was of a sufficiently fatal order considered from the citrus-growers point of view. All the three trees were far more heavily infested with Red-Scale than were the unscreened two control-trees.

In order to make the caging of the trees possible the especially long twigs had to be pruned and their protruding branches bound. After some time fresh young twigs again reached the wire netting at the top and at the sides of the cage. By this contact the growth was checked. For all these reasons an unusually densely grown foliage crown was formed within the narrow space of the cage (see Fig. 2). Because of this and because of the wire covering, the light was dimned, a comparative calm, and consequently also an atmosphere of greater humidity were probably created between the branches and leaves the cages. The results of the experiments may be taken as an indication that wind and air currents carry off considerable numbers of young *Chrysomphalus*-larvae and in this way thin the numbers of the Red-Scale.

Thank to the wire screening, this experiment was performed with strictly controlled *Chilocorus* populations. All *Chilocorus* emigration or immigration was prevented. But the conditions for *Chrysomphalus* propagation thus set up were quite artificial. The results from experiment-tree I however (Red-Scale showed an anomalously high increase on this tree under the conditions of the experiment) are such as cause us to be very sceptical as to the practical value of *Chilocorus*. The numbers of *Chilocorus* that had been introduced into the wire cage cover of this tree was quite considerable — 40 specimens in all — and so large a number should have checked even an anomalously high Red-Scale increase.

When on 9.X. the experiment was concluded I was unable to recover all 40 *Chilocorus*. A long and through search revealed only 10 imagos and some few larvae. Possibly inside the extremely close grown crown of the tree a certain of *Chilocorus* escaped detection. The presence of some larvae and of numerous empty pupal skins seemed to show however that though the *Chilocorus* imagos introduced three months before might have died in considerable numbers, propagation and development of *Chilocorus* may nevertheless have continued.

A greater increase of *Chilocorus* must have occured on the second experi-

ment-tree. On July 25th only 4 imagos had been introduced under the screen. On completion of the experiment one larva and about 25 imagos were found.

The rather discouraging experimental results here reported are in a sense contradictory to those Sachs has published (loc. cit.). The latter worker did not enclose his experiment-trees in cages. My own few field experiments do not enable me as yet definitely to define my position on this result by Sachs.

Fig. 2. — Field Experiment (for explanation see Text).

Only laboratory experiments such as have been proposed above (pages 307 and 313) and whose realization is impossible without suitable equipment, supplemented by numerous field-experiments in different places and times can finally decide (a) whether *Chilocorus* is fit at all for use in biological control and (b) given such fitness how best it may be utilized.

11. Parasites.

At the end of October and in November I found on some *Chilocorus*-pupae several parasitic Hymenoptera (8 specimen in all) which Dr. C. Ferrière (of the Imperial Institute of Entomology in London) identified as *Homalotylus flaminius* Dalm. (Encyrtidae).

Later on, in winter 1934, I frequently observed a parasitic fungus on *Chilocorus*-imagos, which Dr. Reichert, our Mycologist, has informed me belongs to the *Laboulbeniaceae*. This family is known to be exclusively

parasitic on insects especially beetles. The singular appendices by which these Ascomycetae are anchored to the chitin-skin were apparent in our specimens as well. Mostly we saw the green-coloured Ascomycetae on the ends of the elytra.

I obtained no evidence supporting the view that the hymenopterous *Homalotylus* or the parasitic fungus mentioned above is in any degree able to check the propagation of *Chilocorus*. It is even debatable whether the fungus is pathogenic at all.

12. Summary.

The study of *Chilocorus bipustulatus* showed the existence of two periods of depression in this insect's propagation in the course of the year in Palestine. The females laid no eggs during hibernation. By artificial increase of temperature, abundant egg-production and larvae development could be induced in winter. The propagation rate falls sharply in the summer months of May-August. This decrease is due (1) to the very low rate of the egg-production, and (2) to the increased larvae mortality. The extent to which these manifestations are fixed in the character of the generations or are brought about by climatic factors, remains unascertained.

In Palestine 4 strongly overlapping generations are probably the rule. Besides the members of the fourth generation, imagos of the third and probably also individuals of a fifth generation enter into hibernation.

The question of practical value is not definitely decided. (For a discussion of the points that must enter into consideration see pages 307 and 313 and the end of Chapter 10, p. 323).

Contribution à l'étude des Buprestides du Sinaï

(Coleoptera)

par André Théry.

Genre GALBELLA Westw.

J'ai reçu en communication de Monsieur A. Alfieri un exemplaire d'une *Galbella* capturée le 5 mai 1934 au Wadi Ghederat, non loin de Kosseima (Sinaï).

Ce Buprestide me semble devoir être rapporté à *Galbella Harti* O. Janson dont le type est au British Museum où j'ai pu autrefois l'étudier. La description de *Galbella Harti* O. Jans., bien que publiée en 1891, est omise dans le catalogue de Kerremans (Wytsman Genera Insectorum 1903). Elle est décrite dans une publication peu répandue et je crois utile de reproduire partiellement ce qui a été dit à son sujet.

Galbella Harti O. Jans. est décrite dans « Fauna and Flora of Sinaï and Wadi Arabah, by Henry Chichester Hart, London 1891, published for the Committee of the Palestine Exploration Fund, by Al. P. Watt, 2 Paternoster square ». Le type de cette espèce a été trouvé dans les marnes fortement salées qui se trouvent dans le Ghôr, à peu de distance de la Mer Morte. Cette espèce diffère de *Galbella felix* Mars. (*felicissima* Abeille) par sa grande taille et à ce point de vue ne peut être comparée qu'à *Galbella zanzibarica* Fairm., espèce décrite à tort de Zanzibar et que l'auteur lui-même déclare appartenir à la faune somalienne. L'exemplaire que j'ai sous les yeux a la tête et le pronotum noirs, les élytres d'un bleu noir. Janson dit dans sa description que le type est d'un noir bleu.

L'exemplaire communiqué par M. Alfieri paraît être le deuxième individu connu de cette espèce.

Je traduis ci-dessous la description de *Galbella Harti* O. Janson :

Galbella Harti O. Jans. — Long. : 6 mm. ; larg. : 2 mm. 5. — Allongé, ovale, modérément convexe, noir bleu, brillant. Tête convexe, avec une large fovéole superficielle sur le front derrière laquelle se trouve un espace lisse ; antennes fortement dentées à partir du 5ème article, les articles 7 à 11 deux fois aussi larges que longs. Thorax grossièrement ponctué, les points plus rapprochés et quelque peu confluents sur les côtés, fortement impressionné près de la marge antérieure, la base bisinuée, les angles postérieurs aigus. Scutellum triangulaire, lisse. Elytres quatre fois aussi longs que le prothorax, fortement ponctués-striés avec des rangées alternes de points simples au voisi-

nage de la suture, les bords avec une ponctuation confluente, plus grossière, dont les intervalles forment des rides transversales ; la base, les côtés et l'apex confusément ponctués ; métasternum avec une faible carène centrale ; côtés de l'abdomen finement denticulés. Pattes courtes, tibias fortement dilatés, le bord externe arrondi et finement denticulé.

Description de deux Myodaires supérieurs

(Diptera : Trixiini ou Dexiinae ?)

par J. Villeneuve de Janti.

Le genre *Trixa*, qui par ailleurs ne saurait s'évader des *Protachininae*, a cependant quelque chose qui le rapproche beaucoup de la sous-famille des *Dexiinae*, à savoir les soies frontales arrêtées à la lunule, parfois le scutellum à 3 soies marginales subégales, les yeux amoindris, et les pattes allongées des diptères du type pédestre auquel appartiennent les *Dexiinae*.

Ces vues trouvent leur confirmation chez 2 espèces inédites et distinctes qui nous sont parvenues, l'une d'Egypte, l'autre de Chine.

Tête de *Trixa* avec les antennes courtes, insérées très au-dessous du milieu des yeux ; le clypeus creusé pour loger les antennes et plus ou moins rétréci en canal facial sur les côtés duquel se trouve la grande vibrisse assez bien distincte des autres vibrisses qui l'accompagnent ; palpes courts, très renflés, trompe nulle, etc.

Mais, chez l'espèce d'Egypte, le chète antennaire est pubescent ; le scutellum convexe a ses 3 soies marginales développées et subégales, et surtout les caractères suivants des *Dexiinae* sont à retenir : tergite abdominal I excavé à fond et nu, 2 soies marginales médianes au tergite II, 4 soies marginales médianes et 2 latérales au tergite III, une rangée complète de soies prémarginales au tergite IV.

En outre, la 1ère cellule postérieure de l'aile est fermée et court-pétiolée ; le coude porte un assez long prolongement réel ; la transverse apicale est peu arquée, presque droite.

Je fais de cette espèce le génotype de *Trixiceps* nov. gen. et je lui donne le nom de *T. aegyptiaca* nov. spec.

T. aegyptiaca nov. spec. — D'un gris blanc sur fond roux et à reflets blanchâtres ; abdomen oblong à soies robustes auréolées de noir à leur insertion ; thorax à 4 lignes brunes écourtées peu après la suture. Pattes testacées, à tarses noirs, les fémurs partiellement brunâtres, les griffes allongées (♂). Ailes vitrées, ayant une épine costale développée, la 3e section costale (médiastinale) plus courte que la 5e ou subégale, 4-5 cils à l'origine de la nervure III ; transverse postérieure peu sinueuse et externe. Face blanchâtre ; palpes, antennes et base du chète antennaire orangés ; antennes très courtes : 2e et 3e articles égaux. Front du ♂ = 1/3 d'œil. Chez la ♀, les yeux sont réduits, d'où le front plus large qu'un diamètre oculaire, orbites et parafaciaux

également très larges, la bande médio-frontale étroite, moins large que la moitié de l'orbite ; 2 robustes soies orbitaires accompagnées de quelques microchètes ; les 2 verticales et soies ocellaires développées. Grande vibrisse assez bien différenciée. Occiput gris, à peu près plan et plus ou moins roux sur la bande médiane.

Thorax. — Soies acrosticales : 2 paires antérieures faibles et une paire préscutellaire forte ; 3 dc. ; 2 intra-alaires postérieures ; 3 supra-alaires : st. =1+1+1.

Scutellum convexe portant une rangée plus ou moins régulière de soies discales.

Taille : 12-13 mm.

3 individus : Mariout et El Borg, 21.V.25 ; un ♂, Ikinji Mariût, 27.VII.1924 ; Marsa Matruh, VII-VIII, une ♀.

L'espèce de Chine montre encore l'instabilité du groupement rappelant le genre *Trixa* et elle présente des particularités qui justifient la création, pour elle aussi, d'un genre nouveau qui je nommerai *Dexiotrix*. Elle a la tête d'un *Trixa*, mais le 3e article des antennes est allongé et mesure presque 2 fois 1 2 la longueur du 2e, le chète antennaire est plumeux à cils moyens ; les palpes sont moins épais, un peu allongés-cylindriques ; la trompe, quoique courte, est généralement visible. Pas de soies acrosticales hormis une paire préscutellaire. Scutellum convexe à 3 soies marginales subégales. Tergite abdominal I non excavé à fond et nu, 2 soies marginales médianes aux tergites II et III (ce dernier a quelquefois une rangée, mais plus ou moins lacuneuse) ; le tergite IV a une rangée complète. Toutes ces soies abdominales sont robustes ; aucune soie discale.

L'aile est étroite et longue, à cellule médiastinale moyenne, sans épine costale ; le coude subdroit et mousse n'a aucun prolongement, la transverse apicale est longue et cintrée ; la 1ère cellule postérieure est ouverte bien avant l'apex. Pattes longues ; les tarses sensiblement plus longs que les tibias.

D. longipennis nov. spec., ♀. — Orbites et parafaciaux à reflets blanchâtres sur fond noir. Antennes et chètes orangés ; clypeus jaunâtre avec la loge antennaire bien circonscrite et cloisonnée ; palpes et trompe jaunes. Corps d'un brun noir. Le thorax est à reflet d'un gris terreux sur lequel, suivant lumière, se dessinent 3 bandes noirâtres présuturales, la médiane formée de 3 lignes juxtaposées et quelquefois fusionnées ; derrière la suture, il n'y a que 4 traits bruns écourtés. Les épaules et les sutures pleurales assez largement jaunes ainsi que le dessous du scutellum. Abdomen plus ou moins allongé, moins large à ses deux extrémités ; les tergites ont une bande antérieure interrompue de pruine blanchâtre ; le tergite IV est bordé de roux à

l'apex, et sous certain jour, apparaît parfois entièrement blanc. Ailes un peu jaune ocracé, davantage à la base ainsi que les cuillerons ; balanciers à massue blanc jaunâtre. Pattes toutes jaunes, les tarses un peu sales.

Les soies verticales internes et externes, préverticales et ocellaires, développées ; 2 soies orbitaires et la grande vibrisse, longues. 3 dc. ; 2 intra-alaires ; la supra-alaire antérieure longue ; 2 soies humérales ; st. = 1 + 1 ; 6-8 cils à la base de la nervure III, les derniers très espacés.

Taille : 11-14 mm.

Mt. Omei (Szechuen, Chine), en Août, 3 ♀♀ : leg. D.C. Graham, Musée de Washington.

Ueber *Aphaenostemmus testaceus* Koch

(Coleoptera-Staphylinidae)

von C. Koch,
Museo entomologico « Pietro Rossi », Duino.

Die von mir beschriebene Staphylinidengattung *Torre-Tassoella* (1) hat sich nach Vergleich einer mir in liebenswürdiger Weise von Herrn Paul de Peyerimhoff eingesandten Cotype seines *Aphaenostemmus Bordei* mit der Gattung *Aphaenostemmus* übereinstimmend herausgestellt. Es handelt sich jedoch um eine von *Bordei* verschiedene Art und gebe ich im Folgenden die Merkmale, durch welche sich beide Arten von einander unterscheiden, an (2):

a' — Flügeldecken kürzer, ungefähr um die Hälfte länger als der Halsschild. Kopf stärker quer, mit grösseren, stärker vorgewölbten Augen. Halsschild an den Seiten mit zwei seichten, aber deutlichen Eindrücken. Abdomen deutlicher und dichter punktiert, länger behaart. Gestalt viel breiter. Kopf, Halsschild, Abdomen und Unterseite schwarz bis pechbraun. — (Biskra, Algerien) ..... *Aph. Bordei* Peyerimh.

a — Flügeldecken länger und schmäler, ungefähr um zwei Drittel länger als der Halsschild. Kopf weniger quer, fast quadratisch, mit etwas kleineren, weniger vorgewölbten Augen. Halsschild an den Seiten ohne grübchenartige Eindrücke. Abdomen etwas feiner weniger deutlich punktiert und kurz, seidig behaart. Gestalt viel schmäler. Der ganze Körper rotgelb, ein von Herrn Dr. O. Scheerpeltz mir eingesandtes Exemplar mit der Etiktte « Aegypten », weist jedoch dunkelbraunes Abdomen, und rötlichbraunen Kopf, Halsschild und Unterseite auf. — (Wadi Digla, Unterägypten; Wadi Luotaie und Wadi Isla, Sinai) ..... *Aph. testaceus* Koch.

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(1) Publ. Museo Entom. « Pietro Rossi », Duino, No. 1, 1936, pp. 126-133.
(2) Bull. Soc. Ent. Fr., 1914, p. 245.

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